

CHITTENDEN (R. H.)  
Papoid - -

# Digestion,

—BY—

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PROFESSOR OF

Physiological Chemistry

—IN—

YALE UNIVERSITY.

EPITOME OF REPORT  
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# PAPOID.

## EPITOME OF A REPORT ON PAPOID DIGESTION

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Professor of Physiological Chemistry in Yale University

*From Transactions Connecticut Academy, [Sheffield Scientific School.]*

*Vol. IX, 1892.*

Extended study of the reactions of the vegetable ferment, Papoid, shows that it is composed essentially of a mixture of vegetable globulin albumoses and peptone, with which is associated the ferments characteristic of the preparation.

Papoid, so far as my observations extend, has the power of digesting to a greater or less extent all forms of proteid or albuminous matter, both coagulated and uncoagulated. Furthermore, Papoid is peculiar in that its digestive power is exercised in a neutral, acid and alkaline medium. These statements are amply illustrated in the following experiments:

### ACTION ON COAGULATED EGG-ALBUMIN.

The digestions were carried out as follows: Each digestive mixture contained 0.5 gram Papoid, 10 gram of the coagulated egg-albumin and 25 c. c. water, in which were dissolved the necessary amounts of alkali or acid to give the indicated percentages. All the mixtures of the series were placed in a water-bath kept at a temperature of 104–113 F., while they were allowed to stand for 12 hours with stirring. At the end of this time, the undigested residues were filtered off, washed with hot water, after which they were dried at 230 F. until of constant weight.

The following figures show the results obtained.

REACTION.	COAGULATED ALBUMIN DIGESTED.
Neutral .....	57.0 per cent.
0.05% Hydrochloric acid.....	58.4 “
0.10% “ “ .....	40.1 “
2.00% Bicarb soda .....	72.6 “
4.00% “ “ .....	74.2 “

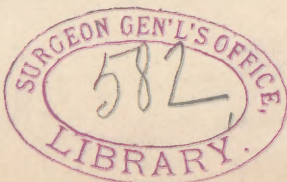
Without Papoid, the above percentages of acid and alkali have little action on coagulated egg-albumin.

Experiments like the foregoing, omitting the Papoid, gave a digestion in acid solution 1 per cent., in alkaline solution 2 per cent.

From these results it is plain that Papoid will digest coagulated egg-albumin in neutral, acid and alkaline solutions, its solvent power being most marked, in this case, in the presence of 2–4 per cent. sodium bicarbonate.

In considering these quantitative results, and those which follow, it must be noted that the figures given can not be taken as an *exact* measure of the extent of digestion, as subsequent investigation showed that the so-called undigested

NOTE.—The temperatures expressed in the original report in centigrade, have in this pamphlet been changed, for convenience, to Fahrenheit.





products, which though insoluble are still products of the activity of the ferment. [Discussion on the *completeness* of Papoid digestion is later in this report considered under the products of digestion.]

### ACTION ON COOKED BEEF PROTEIDS.

The beef used in the series of experiments was prepared from lean beef steak, passed through a hashing machine, washed until all blood was removed. It was then boiled in water and pressed as dry as possible. Each digestive mixture contained 0.5 gram Papoid, 10 grams of the cooked beef and 25 c. c. water, in which were dissolved the indicated percentages of acid and alkali.

The digestions were all warmed at 113 F. for 5½ hours, with stirring, after which the residues were filtered off, washed, dried and weighed as described in the preceding experiment.

REACTION.	COOKED BEEF PROTEIDS DISSOLVED.
Neutral .....	52.5 per cent.
0.05% Hydrochloric acid .....	54.0 "
0.1% " " .....	48.7 "
2.0% Bicarb soda .....	61.7 "
4.0% " " .....	66.2 "

From these results it is manifest that Papoid will digest and dissolve cooked beef proteids far more readily even than it dissolves coagulated egg-albumin, since the above results were obtained in 5 1-2 hours digestion at 113 F.

It is further noticeable that the ferment here, as in the preceding series of experiments, acts most energetically in the presence of 2-4 per cent. sodium bicarbonate, while a slight addition of acid increases the solvent action a trifle over that of the neutral solution.

### ACTION ON RAW BEEF PROTEIDS.

The beef used in this experiment was simply hashed, lean beef, washed free from all soluble matters.

Each digestive mixture contained 0.5 gram Papoid, 10 grams of the prepared beef and 25 c. c. water containing the percentages of acid and alkali indicated.

The digestions were kept at 113 F. for 7 hours.

REACTION.	RAW BEEF PROTEIDS DIGESTED.
Neutral .....	68.4 per cent.
0.05% Hydrochloric acid .....	68.7 "
0.10% " " .....	61.7 "
2.00% Bicarb soda good digestion, but the residue was so slimy it could not be filtered.	
4.00% Bicarb soda good digestion, but the residue was so slimy it could not be filtered.	

Here, as in the preceding experiments, there is evidence of vigorous digestive action, especially pronounced in the neutral solution, although still marked in the presence of both dilute acid and alkali.

### ACTION ON RAW BLOOD-FIBRIN.

Fresh blood-fibrin washed, pressed dry as possible and cut into fragments. Each digestive mixture contained 0.5 gram Papoid, 15 grams moist fibrin and 50 c. c. water, together with the indicated percentage of acid and alkali.

The digestions were warmed at 104-113 F.—8 hours.

REACTION.	RAW FIBRIN DIGESTED.
Neutral.....	44.1 per cent.
0.04% Hydrochloric acid.....	57.6   “
1.00% Bicarb Soda.....	43.0   “

A second series of experiments with raw blood-fibrin was tried, especially to ascertain more fully the influence of an increase of acid on the action of the ferment.

The digestions were continued for 3 1-2 hours at 104-113 F.

REACTION.	RAW FIBRIN DIGESTED.
Neutral,	60.5 per cent.
0.04% Hydrochloric acid.	89.2   “
0.10%       “       “	76.8   “
0.20%       “       “	26.4   “

These two series of experiments show a marked increase of digestive action in the presence of small amounts of hydrochloric acid. The last series especially show that raw fibrin is particularly susceptible to the action of Papoid, both in a neutral and acid solution. In the last experiment it is to be noted that the digestions were continued for only 3½ hours, and yet nearly 90 per cent. of the fibrin was dissolved in one case. This is suggestive, in view of the fact that raw blood-fibrin probably comes nearest chemically to the so-called pseudo membranes, such as are found in Diphtheria, etc., and hence we might fairly draw the conclusion that the pseudo membranes would be attacked by Papoid with equal facility.

These two series of experiments show the effect of dilution on the action of Papoid. In the first series the total volume of fluid in each digestive mixture was 50 c. c., while in the second series, only half of that volume of fluid was used, the amount of Papoid being the same in both cases. Furthermore, in the first series the mixtures were warmed for 8 hours, while in the second experiment the digestions were continued for only 3½ hours, yet in the latter case a very great increase in digestive action is to be noted; an increase which is to be attributed mainly to the greater concentration of the Papoid solution. This constitutes a very good illustration of what I have found to be characteristic of Papoid digestion in general, and with all forms of proteid matter. Papoid will act in dilute solutions, but the best and characteristic action is seen only when a small volume of fluid is present. In this respect, it differs very markedly from the animal ferment pepsin, and for this reason any direct comparison of the two ferments is practically impossible, but blank experiments without Papoid [with acid and alkali as used in these experiments] showed that those reagents have in themselves only a comparatively light solvent action on raw fibrin.

From the foregoing results, it is evident that the statement made at the outset, that Papoid has the power of digesting all common forms of proteid matter and that in a neutral, acid and alkaline medium, is well substantiated by the facts. Papoid is peculiar in that it will digest and dissolve proteid matter in neutral solution, in this respect resembling trypsin, the proteolytic ferment of the pancreatic juice. But trypsin is a ferment associated with the alkaline secretion, and as a proteolytic agent acts to advantage only in alkaline fluids. Papoid agrees with trypsin in so far that its proteolytic action is increased by the presence of an alkaline medium, in some cases greatly increased by the presence of 2-4 per cent.



sodium bicarbonate. On the other hand, the action of Papoid is increased over that of the neutral solution, by the addition of very small amounts of hydrochloric acid, and in some cases, the increase is very marked.

Another action to be noted as characteristic of Papoid digestion is the peculiar physical change it produces on the proteid acted upon. The exact character of the change is dependent upon the condition of the proteid, and in part, upon the character of the medium in which the digestion is carried on. Thus, with a coagulated proteid as cooked beef, there is rapid disintegration and falling apart of the proteid into tiny fragments, until at last the undigested matter has the character of a pultaceous residue. This peculiarity is especially noticeable in the digestion of cooked beef or boiled fibrin with Papoid, in the presence of 0.1 per cent. and even 0.2 per cent. hydrochloric acid. The natural tendency of the acid under such circumstances, especially at 113 F., is to cause the beef fibres to swell up, but this tendency is gradually counteracted by the presence of Papoid, and eventually, but more slowly, there comes about the same disintegration of the proteid seen in the neutral or alkaline solution. With a raw or non-coagulated proteid, on the other hand, there is at first, especially in an alkaline solution (sodium bicarbonate), a softening action, which is in a great part independent of the alkali, followed, it may be, by the formation of an almost solid homogeneous, jelly-like mass, in which the fibres lose their individuality, thus differing from the swelling produced by the alkaline fluid alone.

As the digestion proceeds, the jelly-like mass gradually becomes thinner from the secondary or solvent-like action of the ferment. The same softening, though less pronounced, shows itself with a neutral solution of Papoid, followed by a more or less disintegration, which, however, never takes on the appearance of the residue seen in the digestion of cooked proteid.

## **CIRCUMSTANCES INFLUENCING THE PROTEOLYTIC ACTION OF PAPOID.**

### **Influence of Reaction.**

We have already demonstrated that with coagulated proteids, the highest digestive power is obtained in the presence of sodium bicarbonate, 2 to 4 per cent. Furthermore, that while the ferment is extremely active in a neutral solution, its activity is, as a rule, increased slightly by the additions of small amounts of very dilute hydrochloric acid, which increase becomes marked in the case of raw or non-coagulated proteids. With coagulated proteids, the increased digestive action due to the presence of a small amount of dilute hydrochloric acid is not equal to the increase produced by the presence of sodium bicarbonate. The presence of hydrochloric acid much above 0.2 per cent. inhibits the proteolytic action of the ferment.

However, we cannot argue from these facts that any acid-reacting fluid will produce the same result as hydrochloric acid, or that any alkaline reacting fluid will give the same increase in digestive action as sodium bicarbonate.

These points are well illustrated by the following results, which at the same time show the influence of several common substances upon Papoid digestion of various proteids.

## Influence of Sodium Carbonate.

### Digestion of Cooked Beef.

Time, 5½ hours at 113 F.

	RELATIVE DIGESTIVE ACTIVITY.*
Control, (Papoid alone).....	100
Papoid with Sodium Carbonate..... .25 per cent.	103
“ “ “ “ ..... .50 “	102
“ “ “ “ ..... 1.0 “	97
“ “ “ “ ..... 2. “	99
“ “ “ “ ..... 4. “	84
Sodium Carbonate 2 per cent. no Papoid.....	10

These results show that the presence of sodium carbonate in small quantity tends to increase the digestive action of Papoid. Aside from this increase, the activity of the ferment is not noticeably affected by the alkaline salt until it is present in quantities above 2 per cent., and even then the inhibition is comparatively slight. This seems the more remarkable when it is remembered that sodium carbonate is a fairly strong alkaline salt, and doubtless on that very account fails to produce the marked increase in digestive action produced by the weaker bicarbonate. In any event, it is evident, from the experiment, that Papoid will not be checked in its digestive action by contact with alkaline fluids of the intestinal tract.

Another very noticeable action of Papoid was seen in connection with these experiments. Sodium carbonate, especially the larger percentage, tends to produce a very noticeable and pronounced swelling of the coagulated proteid. Thus in the experiment without Papoid, where 10 grams of the cooked beef proteids were warmed at 113F. with 2.0 per cent. sodium carbonate, the proteid matter was quickly swollen to an almost solid jelly, but in the presence of Papoid this swelling of the proteid was wholly absent, even where the alkali carbonate was increased to 4 per cent. In the presence of Papoid, the undigested residue was thoroughly disintegrated and pulstaceous. The Papoid thus counteracts the swelling action of the alkaline fluid in the same manner as it counteracts the swelling action of dilute hydrochloric acid, already referred to.

## INFLUENCE OF VARIOUS THERAPEUTIC AGENTS AND OTHER SUBSTANCES UPON THE PROTEOLYTIC ACTION OF PAPOID.

In this connection those substances have been chosen which might naturally be combined with Papoid in its application as a therapeutic agent, either internally or externally, or which might perchance exert some modifying influence upon the action of the ferment as a general proteolytic agent. [The experiments were conducted in the same manner as those already described; the digestive activity in each case being compared with that of a control digestion composed of Papoid, proteid and water alone, (the series are grouped with reference to the order in which the experiments were made without regard to any classification of the substances.)]

\*The percentage figures given in the original are here given, and in the following pages in amounts of relative digestive activity.



# SERIES A.

## Digestion of Raw Beef.

6½ hours at 104-113 F.

		RELATIVE DIGESTIVE ACTIVITY.
Control (Papoid alone.)		100
Papoid with Carbolic Acid....	0.5 per cent.	91
" " " " .....	1	87
" " Acetic Acid.....	0.5	65
" " " " .....	1	65
" " Lactic Acid.....	0.5	77
" " " " .....	1	61
" " Dry Human Bile..	2	85
" " Ox Bile.....	4	89
" " Quinine.....	2	95
" " Bismuth Subnit ..	1	68
" " Lime Water .....	100	82

The results in this series show that the inhibition of such an active antiseptic agent as carbolic acid is very slight. The ferment will still act vigorously even in the presence of 1 per cent. of the acid.

In the experiments with acetic acid and lactic acid, the object in view was especially to ascertain the probable effect on the ferment of admixture with an organic acid, such as might be developed in large quantity in the stomach in a case of strong acidity from lactic or butyric acid fermentation.

The percentages of the two acids used were somewhat high, considering the strength of the acids. The results show that the ferment is inhibited slightly in its digestive action by the presence of these large percentages, although not to any very great extent. Possibly the addition of smaller quantities of these acids might lead to an increase in digestive power over that of the neutral solution.

With a view of considering the probable action of Papoid in the intestines, the influence of bile was investigated; the results here given clearly show that the presence of bile offers no obstacle to the action of Papoid.

The presence of Quinine seems to exert no influence. Bismuth subnitrate diminishes the activity of the ferment. [Further experiments showed that digestion will still go on when the salt is present in large excess. Some experiments made with the soluble bismuth ammonium citrate showed that while the bismuth portion of the salt had inhibiting action, the greater alkalinity over the subnitrate gave an apparent increase in digestive power.]

# SERIES B.

## Digestion of Raw Beef.

Eight hours. Temperature 104-113 F.

		RELATIVE DIGESTIVE ACTIVITY.
Control (Papoid alone),		100.
Papoid with salicylic acid, 0.1 per cent.		110.
" " " " 0.2		110.
" " Corros. sublimate,	1-1000	96.
" " " " "	1-2000	110.
" " Chloroform,	4 per cent.	95.



The above results show that salicylic acid in small quantities tends to increase the proteolytic action of Papoid over that of a neutral solution. As is well known 0.2 per cent. solution of salicylic acid is amply strong to act as an efficient antiseptic, preventing the appearance of putrefaction in an organic fluid, even under the most favorable circumstances for its development. Consequently, salicylic acid and Papoid might well be combined where application of the ferment to morbid or suppurating growths is desired. Mercuric chloride or corrosive sublimate, when present in a neutral solution of Papoid to the extent of 1-1000, does not materially interfere with the proteolytic action of the ferment. **This seems somewhat remarkable, and in conjunction with the two preceding experiments makes clear that Papoid, as a proteolytic agent is not checked to any extent in its digestive action by carbolic acid, salicylic acid or corrosive sublimate, three of the best known antiseptics.** With chloroform the result shows some inhibition of ferment action, but it is not very pronounced unless the amount of chloroform is raised to more than 4 per cent.

#### SERIES C.

##### Digestion of Raw Beef.

Six and a-half hours. Temperature 104-113 F.

		RELATIVE DIGESTIVE ACTIVITY.
Control (Papoid alone).....		100.
Papoid with Antipyrin, 1 per cent.....		101.
“ “ 2 “ .....		94.
“ “ 4 “ .....		80.
“ Acetanilid, 1 “ .....		105.
“ “ 2 “ .....		96.
“ Oil Pep'm't, 4 “ .....		96.

The above results show that in the case of the two drugs, Antipyrin and Acetanilid (or Antifebrin), there is an increase in proteolytic action where present in the digestive mixture in moderate amounts. A decreased digestive action is not perceptible except in the case of antipyrin, when the amount present reaches 4 per cent.

[These facts appear the more surprising when compared with those obtained by Chittenden & Bolton,\* showing the presence of 0.5 per cent. of antipyrin to greatly retard the action of pepsin, while above 3 per cent. pepsin action was completely arrested. With acetanilid (or antifebrin), above 1.5 per cent. pepsin action was practically stopped. Pancreatin action was arrested with 0.5 per cent. antifebrin and stopped entirely with 1 per cent.]

#### SERIES D.

##### Digestion of Raw Beef.

Six and a half hours. Temperature, 104-113 F.

		RELATIVE DIGESTIVE ACTIVITY.
Control (Papoid alone).....		100
Papoid with Potassium Chlorate, 1 per cent.....		95
“ Potassium Chlorate, 2 “ .....		97
“ Strychnia Sulph. 0.5 “ .....		90
“ Brucin Sulph. 0.5 “ .....		95
“ Lime Water, 50 “ .....		95

\* Studies Laboratory of Physiological Chemistry, Yale University, vol. 3.

The results in this series show that practically Potassium Chlorate has no hindering action on Papoid digestion; that in the two alkaloids, Brucin and Strichnia, the inhibiting action is very slight; that where Lime Water is present to the extent of even 50 per cent. digestion is not interfered with. It is further noticeable [in series A] that when no other fluid is present but Lime Water, digestion takes place with but little hindrance.

[Similar digestion of raw beef proteids in the presence of Thymol showed that there is but a slight inhibitory effect by this substance upon Papoid digestion. Experiments made with hydrogen peroxide solution (Marchands), revealed the fact that while Papoid will digest in its presence, the peroxide itself will convert easily digestible proteids into difficult digestible products.]

## INFLUENCE OF BORACIC ACID.

### Digestion of Raw Beef.

7 hours at 113 F.

#### RELATIVE DIGESTIVE ACTIVITY.

Control (Papoid alone).....	100
Papoid with 2 per cent. Boracic Acid.....	104

### Digestion of Cooked Beef.

Control (Papoid alone).....	100
Papoid with 2 per cent. Boracic Acid.....	109

### Digestion of Coagulated Egg-Albumin.

Control (Papoid alone).....	100
Papoid with 2 per cent. Boracic Acid.....	105

The results show that upon both cooked and raw proteids the digestive power of Papoid is distinctly increased by the presence of Boracic Acid.

## Influence of Sodium Chloride (Common Salt).

With this salt, three distinct series of experiments were tried, in order to ascertain its influence on the activity of the ferment, in neutral, acid and alkaline fluids. The proteid material used was cooked beef. All of the mixtures were warmed at 113 F. for 5½ hours. The results are shown in the following table:

#### RELATIVE DIGESTIVE ACTIVITY.

	Neutral Sol.	Alkaline Soda Bicarb, 2%.	Acid Hcl. 0.1%.	Acid Hcl. 0.2%.
Control (Papoid without salt)...	100	100	100	100
Papoid with salt 1 per cent....	104	95	145	134
" " " 2 " " ....	107	96	146	134
" " " 4 " " ....	104	93	144	135

From these results it is plain that sodium chloride or common salt increases slightly the solvent action of Papoid on coagulated proteids in neutral solutions, while in an acid solution, 0.1 per cent. and 0.2 per cent. hydrochloric acid, it increases very greatly the solvent power of the ferment. This action of the salt we shall see later is connected with a certain solvent power on one or more of the products of digestion especially formed in acid solutions of Papoid. Salt by itself, or in connection with dilute acid, has practically no power of dissolving the



proteids of coagulated beef. In fact, the presence of salt diminishes decidedly the ordinary solvent action exerted by dilute acid alone. Thus, 0.2 per cent. hydrochloric acid by itself at 113 F., will dissolve about 4.6 per cent. of proteid matter from the 10 grams of coagulated beef, in 5½ hours, while in the presence of 2.0 per cent. of sodium chloride, acid of the same strength, under like conditions, will dissolve only 2.6 per cent. of proteid. The salt counteracts the swelling action of the dilute acid and thus diminishes its direct power.

In an alkaline solution of Papoid, salt appears to inhibit very slightly the proteolytic action of the ferment. In view of the results obtained in the majority of the preceding experiments it would seem that Papoid is characterized by a fair degree of resistance towards the usual inhibitory action of many common therapeutic agents. Certainly, the foregoing results show that Papoid is able to exert its ordinary proteid digesting power under many diverse conditions.

### Influence of Temperature.

Animal ferments, especially those concerned in the ordinary process of digestion, act most energetically, as is well known, at the body temperature. Raising the temperature to near 140 F. quickly brings about a diminution in digestive action, followed by a destruction of the ferment. Lowering the temperature below that of the body is likewise accompanied by a diminution in digestive action. With the animal proteolytic ferments, pepsin and trypsin, digestion is very slow at say 70 F. [It is a well known fact that pepsin is destroyed by a temperature of 160, pancreatin 158.] With diastase, the vegetable amylolytic ferment, the most rapid conversion of starch into sugar takes place at about 130 F.

A study of Papoid digestion, with reference to this point, has revealed a very interesting peculiarity of this ferment, viz: a great resistance towards inhibition of digestive action by high temperatures. Thus, in an acid solution, a larger amount of cooked beef proteids is dissolved at 158 than at any lower temperature, while even boiling the ferment solution fails to destroy entirely the action of the ferment, a fact which is especially true of an alkaline solution of Papoid. Furthermore, at a comparatively low temperature, 68, digestion is very pronounced in both a neutral and acid solution of the ferment, while in an alkaline fluid digestive action is almost as great at 70 as at 113 F.

The following series of experiments, illustrative of these points, were made at the same time and under exactly the same conditions, excepting the specified variations in the temperature and reaction. The digestions were made with cooked beef fibrin. The neutral series containing Papoid alone, the acid series 2 per cent. boracic acid, the alkaline series 2 per cent. sodium bicarbonate. The digestions were continued at the given temperatures for six hours, the fluid itself being brought to the required temperature before the proteid was added.

The results can readily be seen by a direct comparison of the percentages digested under the different conditions, as shown in the following table:

PROTEID DIGESTED.			
Temperature.	Neutral Sol.	Acid Sol.	Alkaline Sol.
68 F. Room Temperature,	36.8%	37.6%	58.4%
104	58.5	58.6	63.9
113	55.9	57.1	63.2
140	66.8	65.7	71.6
158	66.3	69.5	68.8
Solution first boiled and then kept } at 113 F. }	9.1	11.1	30.4
9			

The most striking facts, however, brought out by these experiments are, first, the marked activity of the ferment at the low temperature of 68° (the temperature of the room at the time the experiment was tried) especially in an alkaline fluid; and, secondly, the retention of proteolytic power after the solution of the ferment has been actually boiled. Here the alkaline solution appears to exert a certain protective influence upon the ferment, which is difficult to explain. Certainly the sodium bicarbonate alone will not dissolve a coagulated proteid to any great extent. Hence we are forced to the conclusion that in an alkaline fluid especially, Papoid is extremely resistant to the inhibitory effects of high and low temperatures, so characteristic of most known ferments. This being true, it is obvious that Papoid in the presence of sodium bicarbonate possesses special advantages in cases where it is desired to soften or digest tissue or other proteid matters at comparatively low temperatures. In view of the importance of the fact, a duplicate experiment was tried, in which the digestive action of Papoid was again tested at the room temperature 69-71°. The results certainly warrant the conclusion already advanced, that in Papoid we have a proteolytic agent especially adapted for the digestion of proteid matter at comparatively low temperatures. At the same time, it is a ferment very resistant to the ordinary destructive effects of high temperatures, and is especially characterized by exhibiting its maximum digestive power at about 158°.

### **The Products of Papoid Digestion.**

The foregoing experiments taken collectively testify to the proteid-dissolving power of Papoid under a great diversity of conditions. They do not, however, show that this solvent power is necessarily identical with that of the ordinary digestive ferments.

Such experiments as I have tried bearing on this point clearly show that the proteid-dissolving power of Papoid is due to a genuine ferment action, in which soluble products are formed which so far as ordinary chemical reactions will show are closely akin to, or identical with, those formed in gastric and pancreatic digestion. Leucin and tyrosin are likewise formed, thus showing in another way the resemblance of this ferment to the trypsin of the pancreatic juice.

While in a general way the final products of Papoid digestion are essentially the same under all ordinary circumstances, certain minor differences appear in the primary or side products coincident with changes in the reaction of the digestive fluid and in the nature of the proteid undergoing digestion. Some of these points may be briefly summarized.

In the digestion of coagulated egg-albumin with an alkaline (2.0 per cent. sodium bicarbonate) solution of Papoid, even when the digestion has long been continued at a favorable temperature and the ferment solution strong, there remains undissolved residue. At first glance this would naturally appear to be simply a residue of unaltered, coagulated albumin. On being tested, however, it is found soluble, at least in a great part, in warm 0.2 per cent. hydrochloric acid, from which solution it is reprecipitated by addition of 0.5 per cent. sodium carbonate and redissolved by an excess of the alkaline fluid. This residue is likewise directly soluble in warm 0.5 per cent. sodium carbonate and reprecipitated by neutralization. These two reactions clearly indicate that the above residue cannot be composed of unaltered, coagulated albumin, since this substance is wholly insoluble in dilute acid and alkali. The only plausible inference, there-



fore, is that the so-called undigested residue in this case is composed of an albumose-like body insoluble in 2.0 per cent. sodium bicarbonate, a possible side product of the Papoid digestion of coagulated egg-albumin.

Aside from this peculiar body, the other products of digestion isolated were a deuteralbumose, a fairly large amount of peptone and some leucin and tyrosin. Only a trace of protoalbumose was found, and no hetero. In fact, all of the ordinary primary products of digestion seemed in this case to be replaced by the above described albumose, composing the so-called undigested residue.

In the digestion of raw blood fibrin with a neutral solution of Papoid, a somewhat different condition of things was observed. The undissolved residue contained perhaps a small amount of the body so characteristic of the digestion of coagulated egg-albumin, but certainly not a large amount. The clear, filtered, digestive fluid, however, gave evidence of the presence of a peculiar body which was wholly wanting in the digestion of the coagulated albumin, which upon examination appeared to be a soluble albumose; partaking of the general character of a heteroalbumose, completely soluble in salt solutions, as well as dilute acid and alkali. In addition to this peculiar primary product of digestion, there was found a large amount of more soluble primary and secondary albumose, together with true peptone, leucin and tyrosin.

From blood-fibrin digested with a weak hydrochloric acid (0.05 per cent.) solution of Papoid yields the same products as those just described, the peculiar primary albumose making its appearance here in fully as large quantity as in the neutral digestion, and apparently taking the place of acid albumin, which appeared to be entirely wanting.

In the digestion of cooked beef proteids with a neutral solution of Papoid, as likewise in an alkaline solution, the peculiar body above described was absent, only the ordinary primary and secondary albumoses were observed, together with a large amount of peptone and some leucin and tyrosin.

The above results, therefore, plainly warrant the statement that the power possessed by Papoid of dissolving various forms of proteid matter is dependent upon all ordinary digestive action akin to or identical with that of digestive ferments in general, whether animal or vegetable.

### **Action of Papoid on Milk.**

The action of Papoid upon milk is two-fold. First, under suitable conditions, it brings about a curdling of milk or separation of the casein, more or less complete according to the circumstances. This is followed by the ordinary digestive action of the ferment, in which the precipitated casein is converted into soluble products.

The act of curdling, like the process of digestion, is modified more or less by the conditions under which the experiment is tried. Thus, under some circumstances the curdling takes place quickly and the separation of the casein is quite complete. Under others, the curdling takes place slowly and is very incomplete. These points are well illustrated by the following experiments: Each mixture had a total volume of 100 c.c. composed of 25 c.c. of milk, either fresh or boiled as indicated, 25 c.c. of an aqueous solution of Papoid (0.5 gram Papoid) and 50 c.c. water containing sodium bicarbonate as indicated, or else an equal volume of lime water and water as specified. Some of the mixtures were kept at a tempera-

ture of 110 F. while others were allowed to stand at the room temperature, viz: 69-71 F. Following are the results obtained under the different conditions:

At 104-113 F.

CHARACTER OF THE MILK.	REACTION OF THE MIXTURE.	TIME OF CURDLING.
Boiled.....	Neutral.....	3 minutes.
Fresh.....	" .....	10 "
" .....	10% lime water .....	11 "
" .....	20% " .....	12 "
" .....	2.0% bicarb soda*.....	19 "
" .....	1.0% " .....	35 "
" .....	0.5% " .....	55 "
Boiled.....	2.0% " .....	240 "

In the presence of 2.0 per cent. sodium bicarbonate the boiled milk was very incompletely curdled; apparently the digestion of the casein was quite advanced before any sign of separation could be observed.

In the neutral solution, on the other hand, the curdling of the boiled milk took place almost immediately, as noted, and was at the same time very complete, the casein separating as a fine, flocky precipitate casein, leaving an almost clear fluid. On longer standing at 104 F. the separated casein was, however, gradually dissolved. In the presence of 0.5 and 1.0 per cent. sodium bicarbonate, the curdling of the fresh milk was not as complete as when 2.0 per cent. of the bicarbonate was present. The longer the curdling is delayed the less unalterable casein there will be to separate. In all the above cases where the curdling took place inside of 20 minutes the separation of the casein was fairly complete.

At 69-71 F. Room Temperature.

CHARACTER OF THE MILK.	REACTION OF THE MIXTURE.	TIME OF CURDLING.
Boiled.....	Neutral.....	12 minutes.
Fresh.....	" .....	145 "
" .....	20% lime water.....	} not curdled at the end of 4 hours.
Boiled .....	" " " .....	
" .....	2.0% bicarb soda.....	
Fresh.....	" " " .....	

It is thus evident from the above experiments that the curdling of the milk by Papoid is greatly modified by the temperature of the fluid. However, while precipitation of the casein is delayed by a low temperature, digestion is not retarded, for digestion of the casein whether still in solution or precipitated by the curdling process, unquestionably goes on, although naturally at a slower rate than at a higher temperature. The rate at which curdling is produced is not to be taken as a measure of the probable rate of digestive action on the milk. The two processes are wholly independent, and in the case of predigested milk, where naturally a smaller proportion of Papoid is used than in the above experiments, the necessary digestion is accomplished without any accompanying separation of the casein; whether it be carried on at a low temperature, or at a temperature of 110 F. and in the presence of water alone, or in the presence of sodium bicarbonate

\* The percentages refer to the total amount of bicarbonate or other substance contained in the 100 c. c. of fluid.



or lime water. In predigesting milk with Papoid, or any other ferment, the main object sought is the partial digestion of the casein, this being the most important proteid of milk, and at the same time the one most liable to cause trouble in the feeding of infants and others with weak digestion. In order to test the digestive action of Papoid, on this proteid, the casein was separated from fresh milk by precipitation with dilute acid and partially purified. A series of digestions with Papoid was then made in the manner already described.

The following are the results obtained:

REACTION.	CASEIN DIGESTED.
Neutral.....	29.2 per cent.
1.0% bicarb soda.....	42.9 "
2.0% " .....	41.7 "
4.0% " .....	36.3 "
25.0% lime water....	41.1 "
0.1% hydrochloric acid....	21.0 "

It is thus evident that Papoid is able to digest precipitated casein under all the above conditions, digestion proceeding to the best advantage in the presence of 1-2 per cent. sodium bicarbonate. Also, that lime water constitutes a particularly good medium for the digestive action of the ferment on casein.

The digestive action of Papoid on milk casein was next tested in a somewhat different manner.

Fresh milk, boiled milk, and milk containing varying percentages of bicarbonate of soda were used. The solutions were warmed at 110 F. for 6½ hours, and then undissolved casein was filtered off, washed, dried and weighed. In all of these mixtures, the Papoid produced a separation of the casein inside of an hour, and in much the same order of time as shown in a previous experiment; the natural solution of boiled milk curdling within 5 minutes, while the mixture containing the smallest percentage of sodium bicarbonate curdled last, viz: in 55 minutes. In each case, the initial separation of the casein appeared quite complete, although of course, some little allowance must be made for possible error in the direction. The digestive action in the Papoid, was, however, quite apparent to the eye, the precipitated casein visibly diminishing in amount as the digestion proceeded.

REACTION.	CASEIN DIGESTED.
Neutral .....	42.2 per cent.
" (boiled milk) .....	36.1 "
0.5% bicarb soda.....	38.8 "
1.0% " .....	53.7 "
2.0% " .....	56.7 "

From these results it is to be noted that while boiled milk in a neutral solution is more quickly curdled by Papoid than fresh milk, digestion of the precipitated casein is somewhat less rapid. Further, that digestion is most vigorous in the presence of 2.0 per cent. sodium bicarbonate.

It is evident, however, from all the results, that Papoid, especially in the presence of sodium bicarbonate, is particularly well adapted for predigesting milk, the casein being converted by it, as by alkaline trypsin solutions, into soluble and diffusible products.

## Action of Papoid on Starch.

In addition to the two ferments already described, viz: The proteolytic and rennet-like ferments, there is present in Papoid a third ferment; an amylolytic one, capable of exerting action upon boiled starch. Papoid added to starch paste, preferably in the presence of sodium bicarbonate at 104 F. slowly converts a portion of the starch into soluble starch and into a more soluble dextrin. This reaction is plainly recognizable by the iodine test. It is not at all comparable in intensity to the proteolytic action, but still it does exist and implies the presence of a starch converting ferment.

The best result is obtained in the presence of 2-4 per cent. sodium bicarbonate. A neutral solution of the ferment is also active, although 5 per cent. hydrochloric acid will produce inhibition. In the latter case, however, the ferment is not destroyed, but simply checked in its action, since neutralization of the acid fluid with sodium bicarbonate (or better, making it alkaline) is followed by a renewal of the amylolytic action.

## Probable Action of Papoid in the Body.

Experiments already recorded show that Papoid is active in the presence of percentages of sodium carbonate far larger than normally occur in any of the secretions found in the alimentary tract. In fact, in the presence of 0.5 per cent. sodium carbonate, the reputed average strength of the pancreatic juice, the proteolytic action of Papoid is increased.

The question naturally suggested itself, however, in this connection, whether the alkaline pancreatic juice might not digest and destroy Papoid, thus checking effectually the latter's action. This important question was answered by trying several experiments with artificial pancreatic juice in conjunction with Papoid, one of which may be profitably reported. An artificial pancreatic juice was prepared by warming at 104 deg. F. 1 gram of trypsin (Fairchild's) with 100 c. c. of 1.0 per cent. sodium bicarbonate solution and filtering from the undissolved residue. With this solution, two digestions were made with cooked beef proteids; one with 25 c. c. of the prepared trypsin solution plus 0.5 gram Papoid.

The two mixtures were warmed at 104 deg. F. for six hours. The 10 grams of cooked beef proteids contained 3.5707 grams dry proteid 110 deg. C.

MEDIUM.	WEIGHT OF UNDIGESTED RESIDUE.	PROTEID DIGESTED.
Trypsin sol. alone.....	1.5657 grams.....	56.1 per cent.
“ “ with Papoid.	1.1041 “ .....	69.0 “

From these results it is evident that the two proteolytic ferments, trypsin and Papoid, can work together in the same solution, the latter ferment contributing to the digestive strength of the former. Another point to be taken into account in considering the action of Papoid in the intestine, is the influence of bile. [In results already recorded in this paper, it has been shown that the presence of bile offers little or no obstacle to the action of Papoid in the intestinal tract.]

The only remaining point to be considered is the probable fate of Papoid in the stomach. In this connection, it has already been demonstrated that the ferment is only slightly inhibited in its action by the presence of 0.1 per cent. hydro-



chloric acid, and that even in the presence of 0.2 per cent. hydrochloric acid it exhibits a fair degree of activity; both of which results clearly favor the action of Papoid in the stomach.

Further, while the presence of 0.1 per cent. hydrochloric acid lessens somewhat the action of the ferment, the latter is not destroyed, hence, by neutralization of the acid the inhibitory effect is overcome and the ferment springs into renewed activity when brought in contact with an alkaline medium. Experiments made with an artificial gastric juice show that the presence of pepsin does not appear materially to modify the action of the dilute hydrochloric acid on Papoid. I do not think that gastric juice of a given acidity has any more effect on the ferment than acid of the same strength alone. In any event, Papoid will certainly exhibit marked proteolytic action in the presence of 0.1 per cent. hydrochloric acid and pepsin, although the conditions may not be favorable for the best action of Pepsin.

This is illustrated by the following experiments: An artificial gastric juice was prepared by dissolving some commercial pepsin (Fairchild's) in 0.1 per cent. hydrochloric acid, in the proportion of 0.1 gram pepsin to 25 c. c. of acid. Digestions were then made, with and without Papoid, on raw and cooked beef proteids, with the following results:

Digestions at 104 for 6 hours.

	RAW BEEF DIGESTED.	COOKED BEEF DIGESTED.
Pepsin alone .....	16.9 per cent.	2.3 per cent.
Pepsin and Papoid.....	63.3     "	44.1     "

The presence of pepsin does not interfere with the action of Papoid in an acid medium where the other conditions are favorable to the latter ferment. Any direct comparison of the digestive action of the two ferments cannot well be made, since they act under such totally different conditions as regards dilution, reaction, etc.

With only combined hydrochloric acid present and an excess of proteid matter and salts, a condition of things generally prevalent especially in the early stage of digestion, Papoid cannot well help exerting its peculiar proteolytic power. And in this connection it is to be remembered that Papoid acts to the very best advantage in a concentrated fluid, in the presence of an excess of proteid matter.

From the foregoing experiments the following conclusions may be drawn:

**1. That Papoid is a true, soluble, digestive ferment of vegetable origin.**

**2. That it has marked proteolytic action in acid, alkaline and neutral solutions, and in the presence of many chemicals, antiseptics and therapeutic agents.**

**3. That it has a peculiar softening and disintegrating action on proteids, and that its general proteolytic action is that of a genuine digestive ferment, similar to the ferments of animal origin.**

4. That it has a certain amount of amylolytic or starch-dissolving power.

5. That it has a marked rennet-like action upon milk, and a pronounced digestive action upon milk casein.

6. That it exerts its peculiar digestive power at a wide range of temperatures.

7. That the ordinary conditions of health and disease in the stomach and intestine are not liable to check its action, while certain possible conditions may accelerate it."



**WE** are pleased to quote from the  
Medical Journals of America  
recent clinical data showing  
the physiological action  
of PAPOID.

Resp'y Yours,  
**THE PAPOID CO.,**  
**JOHNSON & JOHNSON, Sole Agents,**  
**New York.**

"*Medical Mirror*," March, 1892.

### DIPHThERIA.

By I. N. LOVE, M. D.,

*Ex-Chairman Section of Paediatrics, American Medical Association.*

[Editorial.]

"An application destructive to the membrane and at the same time germicidal in its effect, is a vegetable product derived from the Papaya Carica and possessed of marked digestive powers, known as Papoid. It comes in the form of a powder, a small portion of which should be used at intervals of one, two or three hours, as may be desired, according to the extent of the deposit which we may desire to remove. The same should be made into a paste with a small quantity of water, and applied with a fine camel's hair brush. I have found this product very satisfactory as a destroyer of the membrane. An additional advantage of this application is that such parts as may be swallowed will serve to help nature to digest whatever food there may be in the alimentary canal. This is not an unimportant point, and right here, in order to emphasize the importance of nutrition, we suggest that in the beginning of the treatment the alimentary canal should be properly emptied and placed in the best possible shape for the securement of nutrition; the greatest enemy to the Klebs-Löffler bacillus, or any other, is well nourished blood. Insist upon an abundance of nourishment from the start, food that is in a form ready to be promptly assimilated. We will not go far wrong if during the progress of our case we give from one to two grains of Papoid just referred to, either in the form of a powder, in a capsule, in solution, or it may be mixed with a little powdered chocolate and sugar and taken as a bon-bon. Given in this way it serves to help the digestive apparatus in the important work that is before it."

"*New York Medical Journal*," July 30, 1892.

### THE DIGESTIVE FERMENT OF THE CARICA PAPAYA IN GASTRO-INTESTINAL DISORDERS.

Extract from article by FRANK WOODBURY, A. M., M.D.,

*Prof. of Clinical Medicine in the Medico-Chirurgical College, Philadelphia;  
Chairman of Section on Materia Medica and Pharmacy in the American  
Medical Association; Fellow of the College of Physicians of Philadelphia;  
Member of Academy of Natural Sciences, Etc., Etc.*

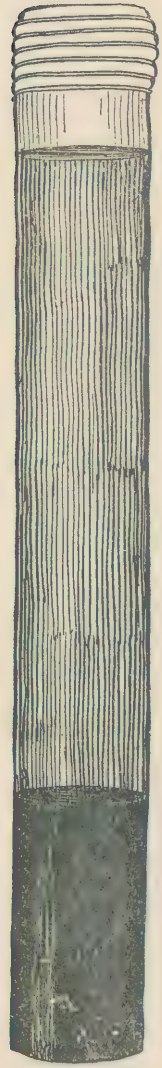
"During the past year, having devoted considerable attention to the clinical applications of Papoid, especially in digestive disorders, I have had the satisfaction of witnessing a number of very interesting results, to which I wish briefly to direct attention. The successful application of physiological data must be my excuse for again directing attention to a remedy the physiological and therapeutical actions of which, at the present day, may be regarded as pretty fully established. Success in therapeutics depends upon the pharmaceutical preparation and mode of administration in many instances, as much as it does upon the selection of the proper remedy.

Papoid is a fine cream-white powder, almost devoid of odor and taste, freely soluble in both water and glycerine, and claimed to be of uniform digestive activity.

The physiological actions of Papoid as a digestive agent have been thoroughly established. It acts upon albumenoids, hydrating them and converting them ultimately into peptones, as fully demonstrated by George Herschell. **It converts starch with great promptness**, the ultimate product being maltose. It emulsifies fats. Moreover Herschell declares that **it has a direct tonic action on the stomach, stimulating the secretion of gastric juice or pepsinogen**. Papoid, according to the same authority, is distinctly antiseptic in its action and prevents abnormal fermentative processes from taking place in the stomach and intestines. **An important point is, that it can be given in conjunction with true antiseptics, without its digestive action being checked; even corrosive sublimate in**



CHEESE.  
 MINCE PIE.  
 MIXED CAKE  
 TAPIOCA.  
 ROAST BEEF.  
 FRIED SAUSAGE.  
 LIMA BEANS  
 & PEAS.  
 WHEAT, RYE &  
 GRAHAM BREAD.  
 POTATOES.  
 DRIED BEEF  
 COD FISH.  
 CRACKERS.  
 SALMON.



Showing the Action of Papoid on Mixed Food.

\* Illustrating test by DR. FRANK WOODBURY. See page 20.

**dilute solutions does not interfere with its digestive powers.** It acts at all temperatures, but attains its maximum activity at a temperature of about 158 deg. F. In several important points it differs from pepsin. **Papoid acts best in an alkaline solution, but also can work in fluids, with an acid or neutral reaction; pepsin requires an acid solution.** Papoid is freely soluble and is most active when in concentrated form; pepsin requires free dilution. Herschell also points out the greater digestive power possessed by Papoid than either pepsin or pancreatine, and states that **"it can be used when pepsin is contra-indicated or powerless."** Finally, it should be stated that Papoid has no action upon living tissues, and is positively innocuous when swallowed in any quantity that is likely to be administered.

Papoid is useful when digestion has been overtaxed, or when the secretion of gastric juice is absent or deficient. Experiments of my own and others have satisfied my mind of the remarkable digestive activity of Papoid. For instance, in one of the experiments referred to, portions of the constituents of a hearty dinner of bread, meat, potatoes, peas, mince pie, and other substantial were placed in a large test-tube and treated with Papoid and bicarbonate of sodium and a small amount of water. The result was very satisfactory indeed; the meat rapidly softened, and the other ingredients gradually disintegrated, forming a pultaceous mass which finally separated into a grumous sediment and an overlying albuminous, dark colored liquid.

\* \* \* Papoid is specially useful where there is indigestion due to deficient secretion of gastric juice or of hydrochloric acid (achlorhydria). The administration of an alkaline solution of Papoid favors gastric digestion both directly and indirectly: by digesting albuminates and softening masses of food, and by the action of the Papoid in stimulating the secretion of the Pepsin gland, while the alkali induces the secretion of a more acid gastric juice; it retards the fermentation of the undigested masses of food in the stomach and prepares them for intestinal digestion.

Papoid prevents duodenal indigestion by taking the place of the pancreatic ferment. As Herschell points out, it is obviously of no use to give pancreatin by the mouth, as it is at once destroyed by the acid of the stomach, and it is practically impossible to administer sufficient alkali to neutralize the excess of acid, and it would moreover be unwise, because it would stimulate still further the secretion of the acid. Papoid is of the greatest use here, because its activity is not materially affected by contact with acid.

In Gastralgia, Papoid, with bicarbonate of sodium, gives immediate relief. It is also useful in irritable stomach, nausea, and vomiting. In sea-sickness, I have not had an opportunity as yet of using it, but I would anticipate decided relief from its administration. In gastric catarrh and the catarrhal conditions of the intestinal tract popularly known as biliousness. Papoid administered in hot water fifteen minutes before meals, or upon rising in the morning, cleanses off the mucus and places the mucous coat of the digestive organs in a good condition for secretion. Constipation, especially in children, is often caused by imperfect digestion. In infants, for instance, the faecal masses consist largely of casein. Here, a digestive agent is the rational remedy to administer, and, in fact, I have used Papoid with good results in just such cases, even in very young infants. On account of its sedative action, it is very efficient for the relief of colic in infants, as well as persistent vomiting. Its antiseptic action and its ability to digest in the presence of antiseptic agents makes it useful in the treatment of irritative diarrhoea in young children, to whom it may be given in combination with Salol or Salicylate of Bismuth. In Apepsia of young children, or in that form of deficiency of the gastric juice in adults due to atrophy of the gastric follicles as the result of chronic catarrhal processes, the glycerin solution of Papoid (1 to 20), is especially effective. It is permanent and retains its activity for a long time, whereas watery solutions should be freshly made or they will not keep their digestive power. (This may possibly be explained on the ground that in the presence of water, Papoid being an albuminoid body, partly undergoes hydration and digests itself). Furthermore, as already stated, watery solutions of Papoid, like other albuminous fluids, are apt to become attacked by Bacteria and undergo decomposition after standing for several days.



The uses of Papoid in treating disorders of the digestive organs may be summarized somewhat as follows:

1. In actual or relative deficiency of the gastric juice, or its constituents.
  - (a) Diminished secretion of gastric juice as a whole.  
Apepsia.  
Anaemia and deficient blood supply.  
Wasting diseases.
  - (b) Diminished proportion of pepsin.  
Atonic dyspepsia.  
Atrophy of gastric tubules.
  - (c) Diminution of hydrochloric acid.  
Achlorhydria.  
Carcinoma.
  - (d) Relative deficiency of gastric juice.  
Overfeeding.
2. In Gastric Catarrh.
  - (a) Where there is a tenacious mucus to be removed, thus enabling the food to come in contact with the mucous membrane.
  - (b) Where there is impaired digestion.
3. In excessive secretion of acid.  
To prevent duodenal dyspepsia.
4. In gastralgia, irritable stomach, nausea or vomiting.
5. In intestinal disorders.
  - (a) In constipation due to indigestion.
  - (b) In diarrhoea, as a sedative.
  - (c) In intestinal worms. (This claim the writer has not personally verified, but as the intestinal mucus which shields the worms is removed by Papoid, it is easily understood that their removal would naturally result after its administration.)
6. In infectious disorders of the intestinal tract.
  - (a) Where there is abnormal fermentation; by its antiseptic action, which, may be heightened by combination.
  - (b) Where there are foreign substances present, its detergent effect may be utilized in cleaning out the debris from the intestinal contents by digestion.
7. In infantile indigestion; here Papoid not only readily peptonizes cow's milk, but the resulting curds are also soft and flocculent, resembling those of breast milk.

The dose of Papoid, ordinarily, is one or two grains, but five grains or more may be used, the only objection being that of useless expense and waste except where very prompt effects are desired, in which case even larger doses of the remedy may be administered. In case of obstruction of the oesophagus by an impacted piece of meat and gristle—such as has been recently reported—a paste of Papoid and water with some soda would produce softening in a very few minutes."

---

*From "The Prescription," May, 1892.*

ECZEMA--

℞. Papoid, gr. xij.  
Pulv. boracic acid, gr. v.  
Aquae distil., 3 ij.  
Ft. solution.  
Sig. To be painted on the parts  
twice daily.

This is a successful application in cases of Eczema, Psoriasis and Callosities of the Epidermis.

*"Buffalo Medical and Surgical Journal," May, 1892.*

"Papoid, or vegetable pepsin, is now becoming recognized as a medicine of value, and will, undoubtedly, take its place in the official list very soon. Johnson & Johnson, Sole Agents, 92 William Street, New York, have recently issued a most interesting pamphlet containing information as to the methods of administering Papoid, and many other facts that have been gleaned from American and foreign literature and grouped in a single brochure, very convenient for reference.

---

*"The Prescription," May, 1892.*

CHRONIC STOMACH CATARRH.—

R    Papoid,            gr.    iss.  
      Sacch. Lactis, gr.    j.  
      Sodæ bicarb., gr.    v.  
M f.   pulv.    i.

Dose, one before each meal.

---

*"Times and Register," September, 1890.*

**Papoid in Gastric Catarrh.**

"We will take it for granted that the proper regimen has been laid down for the patient; he has been told what and how much he is to eat, at what hours, with what beverages the food is to be diluted. He has been cautioned against the bad habits of eating and drinking which have originated the disease. The questions relating to alcohol, tobacco, exercise, and sleep have been settled. What now remains for medicines? The therapeutic Nihilist may say nothing. We say much. Catarrhs once firmly fixed in the mucous membranes, have no tendency towards a cure, even when the exciting cause has been removed.

The principle we now refer to is that of coaxing the organ back to its duty. He is the best physician who can restore health to a diseased function, or organ, with the least disturbance of the body. It has been noticed by every physician who has used pepsin, that the amount of increased digestion is out of all proportion to the direct action of the quantity of pepsin given.

Pepsin, active in an acid medium, is obviously not the drug to be used here, as the digestion carried on in the stomach during the important first quarter or half hour, is alkaline.

We have here, then, a clearly defined need for a remedy, and fortunately we have that indication accurately fulfilled by Papoid. For in this substance, we have a powerful digestant which will begin the work of peptonizing albumen in an alkaline medium. It does not interfere with the action of saliva in converting starch into grape sugar, nor does saliva interfere with Papoid. The formation of peptone is commenced, and when the natural stimulus of food has caused the secretion of the gastric juice, the pepsin simply continues the process until completed. Nor is there any abrupt transition from Papoid-alkaline to pepsin acid peptonization, for, according to Clayton, Papoid continues its action even after the secretion of acid has commenced.

If the secretion of abnormal mucus in the stomach is excessive, it is well to give the hot, alkaline water half an hour before meals, and the Papoid immediately before eating. But in most cases this is unnecessary, as the Papoid itself quickly rids the stomach of mucus. It may then be given in the form of tablet; say in the dose of two to five grains, with a grain of potash or soda, and a minute amount of ipecacuanha or rhubarb. **Papoid is harmless to the healthy stomach, and, being of vegetable origin, is free from organic ptomaines.** In acid dyspepsias it may be given with larger doses of potash; or, it may be given in combination with diastase. Maltine and Papoid form an excellent combination. Whether the asserted virtues of Papoid, in dysenteric and diarrhoeal diseases and in intestinal parasites, depend solely on its digestive powers or not, I am unable to decide from personal experience.



There is another use of Papoid, that, though not strictly physiological, will still be of value as long as human nature continues as degenerate as at present. Men will disregard our warnings and attend lodge suppers, wine parties, etc., where all sorts of rich foods are taken. Now, Papoid appears especially powerful as a digestant of just such food; croquettes, salads, game, are powerfully acted upon by this agent. Especially is this the case with that intractable delicacy, lobster. Papoid digests lobster in any form with remarkable rapidity. Even when lobster and milk have been taken together, and the result is a hard compact mass of casein, Papoid will disintegrate it in a very short time. To these good livers, therefore, we can allow an indulgence in their favorite food, if they slip a few tablets of Papoid into the vest pocket before setting out for the "lodge."

---

*"The Medical Free Press," November 15th, 1891.*

### DIPHThERIA.

By Prof. T. M. Culver, M. D.

"We have recently passed through a very severe epidemic of this most dread disease in some parts of this city, and it may be that some of your readers would be interested in our plan of treatment.

As local application:

R. Papoid..... 3 i.  
 Sal-lister..... 3 ii.  
 Mix.  
 Sig. Blow x grs. in throat every two hours with glass tube.

Out of a record of forty cases treated as above, thirty-five recoveries followed, and gladdened the hearts of as many households."  
 Indianapolis, Ind.

---

*"Mississippi Med. Monthly," January, 1892.*

### DIPHThERIA.

To Remove the Membrane, Papoid is Most Largely Used.

R. Papoid.....grs. 10  
 Aq.....oz. ½  
 (Make the solutions fresh.)  
 Or,  
 R. Papoid... ..drs. 2  
 Beta naphthol.....grs. 3  
 Acid Hydrochlor, Dil.....gtt. 15  
 Aq. Dest.....oz. 4

Either of these should be applied every twenty minutes until the desired effect is had.

---

*"Medical World," June, 1892.*

### CLINICAL REMARKS ON HOT-WEATHER DIARRHŒAS IN INFANCY.

"Where there is intestinal indigestion and irritation, with green slimy stools, Papoid with bicarbonate of soda has a prompt effect. This, as prepared in the form of tablets each containing grain j of Papoid, with bicarbonate of sodium and peppermint. One of the tablets may be dissolved in two tablespoonfuls of boiled water, and a teaspoonful administered every fifteen minutes."

## MODERN METHODS IN THE TREATMENT OF DIPHTHERIA.

### THIRTY-TWO CONSECUTIVE CASES.

BY HOWARD LANKESTER, M. D.

"Some three or four years ago I determined to give Papoid a fair trial in Diphtheria; I did so not 'with faith that makes the weak strong,' but rather with the idea that if it failed it was only no better and no worse than all other supposed remedies. Now, however, I feel that when I fail in curing a diphtheritic patient (unless it be a case of a very malignant nature) in some way or other I must have been at fault, or my instructions have not been carried out faithfully. When Papoid fails to dissolve Diphtheritic membrane, one may be sure it is simply because of one of two or both the following reasons: The solution of Papoid was not placed in direct contact with the pseudo-membrane; or secondly: That the solution was not *absolutely fresh*.

"With so unstable a compound as is Papoid in its moist state, much care is needed to avoid the loss of its extraordinary solvent powers, and it is the want of this care alone that leads to disappointment. Of course I do not mean to be understood to infer that in future no such thing as a death from diphtheria need take place, but I do desire to say that an enormously decreased percentage of death would be the result of the use of Papoid in an intelligent and persistent manner. Now I have before stated that want of care in the preparation of Papoid for exhibition to the patient, is the cause of its failure, if failed it has. The question then comes, how to avoid this risk? Very simply, and perhaps the best way to explain the 'how and the wherefore,' I give a history of one of the many cases of diphtheria occurring in my practice.

"In a family of the name of L——, a case of diphtheria was suspected and a physician called in. This physician was a man of more than ordinary ability, but he held to the old routine treatment. The child died. The next younger child, named Annie, was taken down with the disease and I was called in, not, as the father said, 'with the hope of curing the disease, as I believe it cannot be cured, but as a matter of duty.' When I first saw the case the whole of the back of the throat including the tonsils, was enveloped in a thick coating of membrane, and the case in all looked as bad as one could look, so much so that I told the parents that I anticipated in the near future that I should have to 'entubate' the child. As the case was some miles from town I could only see it once daily, so I had to leave full directions with the father how to act. This was my plan of action. Papoid mixed to the consistency of a thick syrup with a 1 to 5000 aqueous solution of Hydrarg-Bichlor., to be applied thoroughly every 4 hours by means of a brush-probang, *every* portion of the membrane to be brushed over with the preparation; care to be taken not to wound the tender skin around or adjacent to the membrane. Every half hour during the day, or when awake, but never *less often* than every 2 hours night and day, the following spray to be used:

"R Papoid ʒj  
Hydrarg-Bichloride gr 1-6  
Aq: gaultheriæ q. s., a. d., ʒ ii.

"Misce et signe. Use as directed with spray. The remaining treatment consisted in the administration of Tr Ferri Mur. in large doses every four hours, and the heart's action was sustained by the usual routine remedies. On my return in 24 hours nearly all the membrane had disappeared, and what was left was soft and evidently rapidly disintegrating. I, by means of a sponge probang, applied to the throat the following:

R Tr. Ferri Mur. ʒ ii.

"Glycerinæ q. s. ad ʒ ij Misce sig., to be used as directed, ordering this proceeding to be continued every four hours. Spray to be continued as before excepting that the child might be allowed to sleep as long as four hours consecutively. On the third day the child was out of all danger, and it went on to a good recovery, no bad sequelæ resulting. The father thinks that his first child could



have been saved with the same treatment, as he said the initial symptoms of the fatal case were not nearly so severe as in the one that recovered. I therefore think that in Papoid we have not only a new *medicine* but a new *remedy*. And here I wish to state that the germicidal qualities of the Hydrarg-Bichlor. are absolutely necessary to a successful issue, not so much perhaps for the direct action of the germicide on the bacillus, as for its preservative action on the Papoid. I find by experiment that Papoid when moist is very unstable, and that in four or six hours becomes more or less inert if not protected, but in a solution of Hydrarg-Bichloride, I have kept it four or five days unimpaired. \* All practitioners must bear this in mind. Papoid to be the most successful *must be dissolved in a germicidal solution*, and let me add that in this, among other things, Papoid proves its incomparable superiority to pepsin and its congeners, in that whereas the latter ferments are destroyed by a germicide of sufficient strength to do any good, the action of the former is not only not destroyed but actually beneficially increased.

"The above mentioned case is but a type of thirty-two other consecutively successful cases treated as before stated."

*"New England Medical Monthly," June, 1892.*

### PAPOID IN DIPHTHERIA.

"On the fifth of November, 1890, I was called to see a child-boy 11 months old, who had been sick two days. Found throat, roof of mouth and nostrils all occupied by a diphtheritic membrane, ashy gray in color, and the child's surface of that peculiar ashy pallor seen in bad cases of Diphtheria; there was stupor, but no great elevation of temperature. The child could be easily roused, but would be quiet if left alone.

"As I had never known a child under five years old to recover from Diphtheria when the nasal passages as well as the throat were involved, my prognosis was of the gloomiest. Told the parents that I expected the child to die, and if they thought any other doctor could do more than I could, I was willing to turn the case over to him. This offer was not accepted, and I set to work to do what I could. Prescribed:

" R Tr. myrrh et capsici co 3 j.  
Listerine, 3 iij.  
Glycerine, 3 iv.  
M. Sig. A teaspoonful in a half glass  
of water, and of this dilution, a tea-  
spoonful once an hour.

"I had some Papoid tablets made by Johnson & Johnson, containing:

" R Papoid. i.  
Sodii bicarb. iii.  
Ol. menth. pip., } q. s.  
Sugar of milk. }

According to formula on the bottle.

"I split some of these into two parts and powdered them, and directed a powder put on the child's tongue, dry, every two hours.

"I dissolved one of the tablets in a half teacupful of warm water, and having the child held face downward, with a syringe threw the solution up one nostril and the most of the liquid would return through the other.

"The child was also given whiskey diluted, every two or three hours, but not very liberally. Contact of the Papoid caused the membrane to melt away. The throat was not swabbed nor brushed. The nasal injections were used twice a day. No attention was given to the bowels, as they were freely open and no antipyretics were used. The appetite was good and milk was given freely. I am disposed to credit to the peptic action of the Papoid which he swallowed, the appetite and evident good digestion.

"I attended the case six days. On the third day at noon, I thought the child dying from exhaustion, as he was cyanosed and the extremities cold, but a liberal use of whiskey produced reaction, and the child got well without any of the sequelae of Diphtheria."—Blatchley, Ex.

\* NOTE.—See Papoid Glycerole, page 40.

*"The Prescription," July 1st, 1892.*

## THE LOCAL TREATMENT OF DIPHTHERIA.

[Editorial.]

"The profession is still divided as to whether it is primarily a local disease afterwards becoming constitutional, or whether it is a constitutional disease de novo, but we think the greater portion of practitioners lean to the first proposition.

"We are quite confident that if a series of cases are studied carefully, from the inception, and particular attention is paid to controlling the local manifestations, that the course of the disease will be much shortened, and the constitutional systems almost, if not entirely, controlled, with need for but little internal medication, save supporting measures. Papoid is an excellent remedy.

"We do not believe that chlorate of potash or the tincture of chloride of iron are of any value, locally applied."

*"New York Medical Journal," July 2, 1892.*

## TREATMENT OF LEG ULCERS.

Extract from article of THOS. K. MORTON, M. D., Phila., read before the Philadelphia County Medical Society.

"If healing of an ulceration is retarded by the presence of sloughs—and sloughs are very slow to separate in the absence of an active suppurative process—it may be expedient to hasten their separation. They may usually be dissected off without pain, by scissors and forceps. Otherwise the best plan is to digest them out by means of pepsin or Papoid. When pepsin is used for this purpose, I build a retaining wall of tough cerate about the ulcer.

But much more convenient than this will be found the dusting of a minute portion of Papoid (vegetable pepsin) beneath the protective strips and allowing it to act until the limb is redressed the next day. This succeeds well, because Papoid acts best in a concentrated medium of any reaction whatever—pepsin only in a dilute acid solution."

*"Medical & Surgical Reporter," of July 2, 1892.*

## THE TREATMENT OF CYSTS & ABSCESSES BY PAPOID AND PEROXIDE OF HYDROGEN.

By DR. O. A. HYDE, New York.

"The first case was one of sebaceous cyst having existed for at least ten years. When I opened the sac, it was inflamed, partly broken down and about to open at the site of my incision. Its cavity contained about 16 to 20 grams of decomposed serum and pus. I made but a small incision that the fluids might be better retained. The solution employed was as follows, viz:

" R	Papoid.....	15 to 20 grams
	Sodii Bicarb....	5 to 10 grams
	Aquae.....	100 C. C.

"This injection was allowed to remain from 1 to 8 hours, then pressed out of sac, and a strong solution of peroxide of hydrogen introduced to thoroughly clean the cavity. This was repeated once or twice daily. A few weeks of this treatment entirely removed the cyst wall, and satisfactorily cured the case.

"The second case was one of perineal abscess, which had existed for several months, during which period it had been thoroughly injected daily with peroxide of hydrogen solution. The abscess improved under above treatment, but would break down occasionally and discharge pus. I injected a 15 per cent. solution of Papoid, of the formula above given, allowing it to remain in the cavity about 10 to 15 minutes. I cleansed the cavity with peroxide hydrogen solution as before. In a day or so, the abscess closed, and remained so for ten days; it then had a slight discharge of pus, but an injection of peroxide hydrogen was followed by permanent closure of the sinus. This treatment was given three or four months ago.



**"The prompt arrest of this abscess from a single injection of an alkaline 15 per cent. solution of Papoid, greatly surprised me. The cure cannot be attributed to peroxide of hydrogen, as this had been used for months with favorable, but not curative results; employed after the Papoid, it simply or mainly oxidized the debris or digested pyogenic membrane, facilitating its removal."**

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*"Medical Tribune," July 15, 1892.*

### **PAPOID IN GASTRO INTESTINAL CATARRH.**

L. M. WRIGHT, M. D., New York.

"I jot down the following experience relative to the use of Papoid in chronic and acute gastro-intestinal catarrh.

This class of morbid phenomena has been exceedingly troublesome, and its presence in both adult and early life is prevalent to such a degree that not a day passes but the busy practitioner will have this difficulty to confront. Chronic gastric and intestinal catarrh are recognized as 'the twin scourges of humanity,' and in the large majority of instances caused by unhealthful and improperly digested foods.

For the past year I have treated this class of cases with this new remedy, Papoid, at first timidly, as I had been disappointed in other digesters.

Now I can note many cases, some entirely well, and others, old and of long standing, whose existence is rendered comfortable by the aid of this natural digester.

When a patient complains of feeling cross within two hours of a meal I give a powder composed of Papoid  $1\frac{1}{2}$  to 3 grains. This seems to arrest fermentation and neutralize acidity, allays irritation, and controls the formation of gases in the alimentary canal. Sometimes I combine calamus, equal parts, especially if there be pain and uneasiness in the bowels caused by flatus, or if there exist torpor and debility of the alimentary canal.

Where there is an acid taste in the mouth I combine 3 to 5 grains of sodium bicarbonate with  $1\frac{1}{2}$  grains of Papoid, one powder before and one after each meal. I always expect the happiest results from this treatment. Should there be a softening of the mucous tissues then I give borate of soda in place of the bicarbonate.

In marasmus I usually triturate Papoid with sugar of milk, equal parts, and give one to two grains at a dose. I have found it to yield good results in both acute and chronic cases. I have likewise found it soothing and healing in that type of sore mouth which attends and results from a derangement of digestive energy."

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*"Times & Register," July 9, 1892.*

### **TREATMENT FOR CYSTITIS ASKED.**

"The case is one of myelitis, requiring massage, faradization and Turkish baths. For the acid dyspepsia, Papoid and maltine before meals."

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*"New England Medical Monthly," April, 1893.*

### **APPENDICITIS.**

ROBT. T. MORRIS, M. D., New York.

"Now the patient can live.

Don't forget what happened after it was thought advisable to rest content with draining the first abscess.

A practical point in the after treatment of these cases of peritonitis is this, the digestive apparatus is paralyzed so that food ferments instead of digesting, and that means the production of inflating gas and dangerous toxic substances. The patients need predigested food, and I feel that in these cases Papoid is better than pepsin because it is in itself clean and carries with it so few of the microbes of fermentation and putrefaction which abound in pepsins."

*"New England Medical Monthly," Sept., 1892.*

"CONSTIPATION.—

R Aloin, gr. 1-5  
Ext. bellad. gr.  $\frac{1}{8}$   
Ext. nux Vomica, gr.  $\frac{1}{4}$   
Papoid, gr. iss.  
M. ft. pill No. 1. (Use no water to  
form mass.) (Keep in air tight vials.)  
Dose, one pill once or twice a day."

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*"New York Medical Journal," September 17th, 1892.*

### "DISEASES OF THE STOMACH."

Extract from a Review.

By C. A. EWALD, Extraordinary Professor of Medicine at the University of Berlin, etc. Authorized translation from the second German edition, with special additions by the Author. By MORRIS MANGES, A. M., M. D. Attending physician to the outdoor department, Mt. Sinai Hospital, New York City, etc.

"In treatment, hydrochloric acid is given a prominent position. Attention is called to the absurdity of giving pepsin, unless it has been demonstrated that that ferment is absent. If there is complete absence of hydrochloric acid, pancreatin or Papoid may be administered, though the former preparation is useless under any other condition."

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*"Medical Summary," September, 1892.*

"For the stomach troubles of the last six or eight weeks of pregnancy, five grains of Papoid is a specific."

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*"Medical and Surgical Reporter," Sept. 24th, 1892.*

"In favorable cases timely tracheotomy may sometimes prevent stenosis of the larynx, and sometimes inhalations of lime water, Papoid, lactic acid, etc., may cause a loosening of the false membrane."

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*"Mississippi Med. Monthly," September, 1892.*

"Messrs. Johnson & Johnson have taken great pains to make Papoid absolutely pure, and it is rapidly coming into use as a digestive agent."

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*"The American Practitioner and News," September 10th, 1892.*

W. W. RICHMOND, M. D.

"In a pamphlet entitled 'Papoid, Its Formulæ and Methods of Use,' Johnson & Johnson have rendered a valuable service to the Medical profession in putting in concise form the results of administration of Papoid, so as to render accessible to the busy practitioner what otherwise would be difficult to obtain. Papoid, derived from Papaya Carica, is a digestive remedy, new and vegetable, and its importance an undisputed fact. This new remedy is considered of great utility in disorders of digestion, stomach catarrh, chronic dysentery, and flatulent diarrhoea. Among the foremost applications are its administration in the displacement of the false membrane, which occurs in Croup and Diphtheria. In the use of Papoid for Diphtheria results are very satisfactory: the arrest of the disease, destruction of bacteria, displacement or detachment of the membrane so as not to



reform, easy respiration, and in a large majority of cases, complete cure are specified as resulting from its use. In attestation of its merit in the treatment of other diseases, the success which has been attained is triumphant.

In surgery, 'cancerous growths,' fissure of the tongue, and diseases of the ear, together with adhesions and false tissues, the success claimed for it is equally high. It certainly commands attention and justly deserves the prominence given it."

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" *Journal of Balneology*," October, 1892.

## THE DIGESTION OF STARCH BY PAPOID.

By FRANK WOODBURY, A. M., M. D.,

*Prof. of Clinical Medicine in the Medico-Chirurgical College, Philadelphia;  
Chairman of Section on Materia Medica and Pharmacy in the American  
Medical Association; Fellow of the College of Physicians of Philadelphia;  
Member of Academy of Natural Sciences, Etc., Etc.*

"The following experiment proves that Papoid is fully capable of digesting starch. If we put into a test tube some starch, paste or jelly, and add to it an equal bulk of a solution of Papoid Powder at the temperature of the body, and thoroughly mix them, the starch is dissolved. To this solution we next apply the iodine test, which will give a reddish violet color reaction, showing the presence of erythroextrin and amyloextrin. In the course of twenty-four hours, the iodine test, if now applied, will not produce any reaction, the starch having been converted into achroöextrin, and the application of Fehling's test will give the ocular proof of the presence of a large percentage of a reducing substance, which by other means is shown to be maltose. Maltose is a fermentable, crystalline sugar, allied to cane sugar (saccharose), but having less sweetness; it is readily assimilated in digestion. The action of Papoid is precisely analagous, therefore, to that of ptyalin, or pancreatic extract.

Some practical experiments upon food showed conclusively that Papoid acts well especially on those containing cooked starch, such as bread, potatoes, beans, peas, corn, rice, arrowroot, and so on. As to the strength, it is difficult to determine positively, since the action is immediate upon a portion of the starch, and continues almost indefinitely, it appearing to be difficult to destroy Papoid by starch. **One part of Papoid will convert many thousand, perhaps a million, parts of hydrated starch.** It has been found that the action of Papoid upon starch is facilitated by the presence of an alkali such as sodium bicarbonate, just as it is in the case of the digestion of proteids. As regards quantity, a couple of grains of Papoid with five grains of soda, with a tea-cupful of starchy food, such as rice or farina, will give marked results towards conversion during the usual period of digestion, commencing instantly. The action is more energetic if the temperature be raised to blood heat and steadily increased up to 130° F., at which point Papoid has its highest degree of efficiency. It is however, active at lower temperatures, and is not entirely destroyed by a temperature as high as 200° or even 210°F.

Papoid is freely soluble in water, probably to the extent of ninety per cent. The solutions also contain globulin and a form of peptone albumen of vegetable origin. In a state of solution the ferment will react upon this albumen and decomposition follows; **aqueous solutions, therefore, do not keep well, and a solution of Papoid in Glycerine (five per cent.) affords a more eligible, and perfectly stable, solution for experimentation or therapeutie administration.** The more convenient form, however, will undoubtedly be the tablets of Papoid and Bicarbonate of Soda flavored with menth, which makes them acceptable to patients who have become accustomed to soda mint tablets, which possess no digestive power and ultimately increase the disorder for which they are employed. **Papoid, on the contrary, has decided antiseptic action, thus tending to pre-**

vent fermentation of starchy food, and acts as a solvent precisely like the normal digestion of starches by the pancreatic secretion, whose action it supplements, making it especially valuable in intestinal dyspepsia associated with imperfect digestion of starchy foods or carbohydrates. It has a very striking advantage over pancreatin administered by the mouth, in that the latter is destroyed in the process of gastric digestion, while Papoid is not.

When there is indigestion of starchy foods I have applied the foregoing physiological facts, and given Papoid and soda tablets either immediately or, if there is much flatulence and pain in the bowels, from half an hour to an hour after the meal, with very happy results."

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*"National Medical Review," October, 1892.*

### DIGESTION OF STARCH BY PAPOID.

[Editorial.]

"A simple glance at the advertising pages of any medical journal illustrates how important has become the study of dietetics. We understand better to-day than ever before that, so far as the building up of tissue and the repair of waste is concerned, it is not what we eat, but what we digest. Dr. Frank Woodbury, professor of Clinical Medicine in the Medico-Chirurgical College of Philadelphia, has contributed much to this department of medicine. In the September number of the *Journal of Balneology* he presents the results of experiments on the digestion of starch by Papoid. Dr. Woodbury believes that as nature has provided at least three different secretions which act upon starch, and as a very large proportion of our daily food consists of cereals and other starchy materials, it must follow that the digestion of starch is of the highest importance. By the digestion of starch Dr. Woodbury understands those series of changes which, commencing by liquefaction; proceed with the formation of amyloextrin, erythroextrin and achroöextrin, and terminates in the entire conversion of the original starch into maltose with a greater or less proportion of dextrin. He says the former idea that starch was converted immediately and totally into grape sugar has been shown to be erroneous. Then follows a minute description of each step in the series of these changes; and this is followed by a number of experiments with Papoid.

The conclusion is that the action of Papoid is precisely analogous to that of ptyalin, or pancreatic extract. Practical experiments upon food showed conclusively that Papoid acts well on those containing cooked starch, as bread, potatoes, beans, corn, rice, etc. Even on raw starch, Papoid has some action, only it is slower. The action of Papoid is immediate and continues almost indefinitely. In fact, it appears very difficult to destroy Papoid by starch. **"One part of Papoid will convert many thousand, perhaps a million parts of hydrated starch."** Its action is facilitated by the presence of an alkali, such as sodium bicarbonate. It is very active at blood heat, and reaches its highest degree of efficiency at 130 F. Yet it is not entirely destroyed by a temperature as high as 200 or even 210 F. It is freely soluble in water to the extent of ninety per cent. It has decided antiseptic action, tending to prevent fermentation of starchy foods. It is especially valuable in intestinal dyspepsia associated with imperfect digestion of starchy foods. It has a very striking advantage over pancreatin administered by the mouth, in that the latter is destroyed in the process of gastric digestion, while Papoid is not. The most convenient form for its administration is in the tablets of Papoid and bicarbonate of soda flavored with menthol."



*"Medical Summary," October, 1892.*

**PAPOID  
IN ACUTE DYSPEPSIA.**

ABRAM LIVEZEY, M. D., Yardley, Pa.

"This 'vegetable pepsin' is being forced upon the notice of the profession very strongly, and having never seen much good from pepsin, I resolved to try it. The case was previously diagnosed by a doctor as one of flatulence of the stomach only, and he prescribed pill, assafoetida. When I returned home she consulted me, and I diagnosed her case as one of acute dyspepsia—all food hurting her; fermentation, or at least flatus, was rapidly evolved; epigastric region very much puffed out; she thought she had a tumor—was sure of it, etc.; could not bend or stoop forward, could not use the wash-board in washing, etc., etc. I gave her powders of Papoid and boracic acid—Papoid and charcoal chiefly—and she was speedily relieved.

**Papoid and Soda Tablets**—I have been much pleased with these tablets in cases of slow digestion attended with flatus. I have derived positive and prompt effect from them, which I never did from pepsin alone or in combination."

*"Daniel's Texas Medical Journal," October, '92.*

**PAPOID IN ENTERIC OR TYPHOID FEVER  
IN THE VERY YOUNG AND VERY OLD.**

BY W. B. WEST, M. D., Fort Worth, Tex.

"My treatment of this case was quinine at night and sulphurous acid during the day. His digestion was at one time during the attack very much impaired. I used pepsin, bismuth, Papoid, etc. The Papoid acted like a charm in this case in two grain doses every three hours."

*"The Prescription," November, '92.*

ALCOHOLIC CATARRH.—

Sip a tumbler of hot water on rising; after lunch and dinner take:

℞ Papoid, grs. xviii.

Divide in 12 powders.

Take one in a little water quarter-hour after eating.

*"Medical Bulletin," December, '92.*

"The remainder of the hour was occupied by remarks upon two cases of headache in men associated with nasal hypertrophies; and two cases of stomach disorder, in women, one of which had been taking Papoid with marked benefit, and in the other washing of the stomach was prescribed and the method demonstrated."

*"Medical World," December, '92.*

**BLIND ISCHIO RECTAL FISTULA.**

A. M. OWEN, M. D., Evansville, Ind.,

*Ex-Prest. Miss. Valley Med. Ass'n. Treas. Pan Amer. Med. Congress, &c.*

"Yours of recent date to hand. In answer to your inquiry regarding Papoid, would say that I have prescribed it every day since the Detroit meeting. I had been slow to use Papoid because of the fact that there are so many new remedies on the market. Many of these have greatly disappointed me. At the Detroit meeting I conversed with a number of friends. The reports which they gave regarding Papoid were so flattering as to induce me to give it a trial. The cases in which I have generally prescribed it are those in which pepsin is indicated (I have had most unsatisfactory results from pepsin, thus I resorted to Papoid, and the results have not once been a disappointment to me). In its surgical use I can say but little, having used it in but few cases, but these were satisfactory. One particularly worthy of attention was one of long standing (twenty years) Blind Ischio

Rectal Fistula. This case had been operated upon repeatedly and treated by some of the best men in the country. All treatment had failed. I had operated upon and treated the case for about a year, and had given it up as one beyond my ability to manage. What I am about to state may seem somewhat startling, but is none the less true. After proper preparation of the fistulous tract, one injection of Papoid effected a cure, at least it has been well for about two months.

Wyeth says that in surgery, where you are in doubt about the case, always play 'trumps' (the knife being the trump). I say if you are in doubt about a prescription where the gastro-intestinal tract is involved, play trumps by giving Papoid."

"The Medical Standard," Dec., 1892.

### PAPOID IN DYSPEPTIC STATES.

By A. J. PARK, M. D., Chicago.

"Dr. Woodbury\* has given an extended analysis of the physiological action of Carica Papaya. To his results certain cases recently coming under my observation lend clinical corroboration. It has been of special value in all states where the digestive functions are feeble, inoperative, and seriously impaired from catarrhal complications, or from any other cause, since it is most emphatically indicated when the digestive fluids are unequal to the task of converting the ingesta to a condition preparatory to assimilation.

Case I. Young lady, æt 19. Symptoms: The patient was pale, languid, and debilitated; loss of appetite; pulse feeble, compressible, and small in volume; troubled with insomnia, and extremely nervous. The food that she took was not digested—it was simply decomposed, attended by persistent and annoying eructations of gas, acid in character; she complained of a great pain in her head, distress after meals, constipation, and irregular menses. I prescribed the following:

R    Mass. hydrarg..... gr. xii  
       Ex. colocynth, co..... gr. vi  
       Ex. belladon..... gr. iii  
       Ex. hyoscyamus..... gr. xii  
       Podophyllin..... gr. ii

M. ft. et div. in pil, No. xii. S.: One at bedtime.

Having relieved the constipation, I prescribed Papoid, bismuth and strychnine as follows,

R    Papoid..... gr. xv  
       Bismuth sub. nit..... " xxx  
       Strychnin..... " 1-12

M. Div. in ch. No. x. S.: Take one powder before breakfast and one before dinner. The first powder to be preceded by a coffee-cupful of hot water, taken as hot as it can be borne.

This case represents a very numerous class, which are exceedingly common, instantly recognized, and are successfully treated when Papoid is the remedial agent used. In one week this patient reported herself immensely relieved. She said that after the second day the eructations ceased, the acid condition was changed, the distress in her stomach was relieved, the sensation of fullness in her throat disappeared, her appetite improved, the insomnia gave way to restful sleep, and, to use her own forcible phrase, she 'had escaped from the horrors of dyspepsia and the intensified horrors of insomnia.'

Case II. A gentleman of 35—a remarkably active, clear, intellectual man of tireless energy, and a great sufferer from nasal catarrh, which he had had for fifteen years; it had utterly destroyed the sense of smell; the olfactory had ceased to respond to any appeal, and the catarrhal condition had extended to the stomach and duodenum. He complained of complete loss of appetite, pain in his head, with a furred tongue, constipation, sleepless nights, aversion to exercise, owing to his physical prostration, and a general feeling of fatigue. He had considerable palpitation of the heart, and was deeply imbued with a perpetual apprehension of the recent discovery of heart failure, from which he expected to die at any

\* Medical Standard, Vol. VII.

moment. Having allayed his fears of heart failure, and convinced him that his palpitation was directly attributable to indigestion, I ordered him to take a coffee-cupful of water as hot as he could sip it, half an hour before breakfast, and then take one pill ten minutes before.

R Papoid..... ̄ i  
Podophyllin..... gr. ii  
Hydrastin..... gr. ii  
Ex. hyoscyamus..... ̄ i

M. ft. et div. in pil. No. xx. S.: Take one pill before each meal.

In addition, I prescribed hydrastin and eucalyptus an hour after each meal, and a laxative at bedtime. The hot water was continued for ten days; then I abandoned it, and placed him upon—

R Papoid..... gr. xxiv  
Sod. bi-carb..... 3 ss  
Bismuth sub. nit..... 3 ss  
Elix. aromat..... f ̄ i  
Aq. menth. p. q. s. ad..... f ̄ ii

M. S.: Shake the bottle and give a teaspoonful before each meal.

The catarrhal condition of his stomach, nasal passages and upper bowels proved a most formidable obstacle, and sustained a very obstinate set of symptoms to combat.

He had devoted several weeks, under the professional care of an excellent specialist in laryngology, to the treatment of his catarrh—spraying and insufflation, etc.—which only afforded him temporary relief in this humid atmosphere and changing temperature. I ordered him to continue this course of treatment for six weeks, which he did during my absence from the city. Upon my return he presented himself at my office, and reported such a radical change in his symptoms towards complete restoration of his health—which his appearance fully sustained and vindicated—that the same line of medication was adhered to for a short time longer, and, within two months from the commencement of his case, he was discharged cured.

It must be remembered that he had been treated by several excellent physicians, who had in every way met every indication and symptom that presented in his case with a host of remedies—scientifically and intelligently prescribed—aided by a long list of dietary articles of the very best quality—peptinoids, pepsin, pancreatin, beef extracts, maltine, with its numerous and valuable additions. He had tried the grape cure, the skimmed-milk delusion, and various other good remedies for certain conditions. Within a week from commencing the administration of that wonderful remedy his symptoms changed. His headache left him: the great distress in his stomach, which tortured him for hours after meals, ceased; his tongue became perfectly clean, bowels regular, appetite excellent, complexion clear, spirits revived, and a general appearance of returning health and rejoicing.

The ruling remedy in this case was the Papoid; he having been carefully and scientifically treated for months upon the old plan of remedial agents that I have named without any perceptible relief, and changing directly to a new course of treatment in which Papoid was the chief factor, there is but one logical conclusion to arrive at as to the remedy that wrought the change.

Case III. This patient, who had complained for several years of catarrh of the bladder, following an aggravated attack of cystitis, applied to me for advice and treatment for his urinary difficulties, which he stated were constant, painful, annoying and aggravating to the last degree of endurance.

He had traveled extensively in Europe, spent several seasons at Weis-Baden, and had tried the waters at several health resorts in Germany, returning home without much improvement except of a transient character.

As the patient was over 70 years old, and greatly broken in health, I was not at all sanguine of affording him much relief, and not anxious to undertake the case, which I fully explained to him. That his age and the many years of his physical martyrdom were decidedly against his recovery, all of which he at once conceded, and stated that he only expected and only sought temporary relief. His array of symptoms were truly formidable. He was suffering from dyspepsia, with



a full train of attendant manifestations; was in constant dread of heart failure, pain in epigastric regions after taking the slightest nourishment, and complained of acid eructations and throwing off gas from the stomach; was much troubled with palpitation of the heart, with an intermittent pulse—with a feeling of general surrender to the persistent invasion of diseases.

His vesical catarrh was a prominent feature in the multiplicity of his murmurings, and his chamber more than established the fidelity of his painful recitals.

I prescribed the following treatment for him, to relieve his costive habit and to arouse his inactive and torpid liver and secretions. I ordered:

℞   Mass. hydrag.....gr. xxiv  
      Ex. colocynth, co.....gr. xii  
      Podophyllin.....gr. iv  
      Leptandrin.....gr. vi  
      Ex. hyoscyamus.....gr. xxiv  
      Ex. belladonna.....gr. vi  
      Ex. nux vomica.....gr. vi  
      M. ft. et div. in pil. No. xxiv, S.: Take one pill at bedtime.

After five days I commenced the following plan: I washed his bladder out three times a week; first with equal parts of milk and water, pretty warm, then with boric acid, and lastly with hydrastin and Papoid.

I gave him Papoid in combination with soda bicarb. and bismuth, and ordered him to take six ounces of water as hot as he could every morning, with ten grains of sodium chloride, and to take the Papoid mixture in the middle of his meals; and once a week he was subjected to vigorous massage by a strong and healthy operator.

I regulated his diet to conform to the indications of treatment. In six weeks he had gained five pounds in weight; the mucus that formerly threatened supremacy in his chamber had almost disappeared. His indigestion was immensely improved, his appetite had returned, and to use his own words: 'That Papoid is surely the long-sought rejuvenating elixir of youth.' I gave Papoid the credit, because he had traveled the old line of treatment through many years of patient, persevering and unfailing faith, suffering the pains and penalties attending misdirected effort and stubborn adherence to remedies which have survived scientific application. When the secretions of the stomach are in perfect accord with those remedies the results are quite satisfactory, but administration of pancreatin, pepsin and pepsin mixtures indiscriminately, without regard to the condition of the stomach, is a blind and empirical method of meeting the abnormal condition presented."

## Papoid solutions must be made fresh.

*"The Doctors' Weekly," December 24, '92.*

### SOME OBSERVATIONS ON THE CLINICAL USES OF PAPOID.

BY ARCH DIXON, M. D., Henderson, Ky.,

*President Kentucky State Medical Society, Ex-President Miss. Valley Med. Association, Member American Medical Association, Member Southern Surgical and Gynæological Association, Etc., Etc.*

"My attention was called to Papoid about two years ago, since which time I have had occasion to test its merit in diphtheria, dyspepsia, indolent ulcers, as a solvent of dead bone, etc., and in each and every case it served me well. First of all, I may say that I was a doubting Thomas when I began its use, but was soon converted into a firm believer in its efficiency to dissolve pseudo-membrane.

It acts in either acid, alkaline or neutral solutions, and its affinity for fibrin is so great that being placed in contact with it, no amount of washing will remove or stop its action. This being the case, the natural inference arises that Papoid is an agent that would be most useful in the treatment of diphtheria, membranous croup, or in that of any condition in which there is disposition of false membrane.

#### DIPHTHERIA—

A case in question was that of a child three years old, whose throat was almost a solid mass of diphtheritic membrane. Two days before a sister of this child had died of diphtheria, in spite of every effort I could make to save her. The treatment had been the 1-32d of a grain of bichloride of mercury every five hours, and a mixture of equal parts of Tr. Ferri Chloride and Glycerine painted over the inside of the throat every four hours. In addition to this the throat was sprayed regularly at intervals of six hours with hydrogen peroxide, stimulants were administered freely, and nourishment as well. With strict attention and excellent nursing this child died under the above treatment. Ten days afterward, when called to see her sister, I determined to give Papoid a thorough trial. A saturated aqueous solution was prepared, and instructions left to paint over the entire throat every two hours, but decomposition took place rapidly in the solution. **I learned by experience that watery solutions should be made fresh.** There is now on the market a liquid preparation of Papoid known as Papoid Glycerole, which is a very convenient one. Unable to secure this at the time, I used the following: Papoid one drachm, glycerine two drachms, and acid carbolie, drops four. This mixture remains stable. The throat was thoroughly painted over every two hours with a mop made of absorbent cotton twisted upon a small twig, each mop being burned immediately after using. Constitutional treatment was kept up as well. Recovery was prompt and uninterrupted. Of course there are malignant cases of diphtheria, which go on and die promptly, no matter what treatment one may employ, but, with an experience extending over fifteen years, **I have found nothing in the treatment of this dread disease so satisfactory as Papoid.**

#### INDOLENT ULCERS—

But perhaps the most striking example of the efficacy of Papoid is in the treatment of indolent ulcers. It will digest and almost liquefy a slough in a time so short as to be astonishing. Since my first experience with Papoid in this way, I have utterly abandoned the use of the sharp spoon, which was at all times painful and not always satisfactory. If Papoid powder is sprinkled over an indolent ulcer and covered with protective strips it will be found, on redressing in twenty-four hours, to be almost entirely changed in character; the tough, almost fibrous covering of the ulcer has been broken down and disintegrated, the whole or nearly all of it can be wiped off with absorbent cotton, leaving a clean, healthy-looking sore, which readily yields to treatment by cleanliness and compression equally applied. I have recently treated a case of ten years' standing in this way (which had drifted from one physician to another) with the most gratifying result. From a surgical standpoint, Papoid is destined to play an important part in the cleansing of abscess cavities, the removal of blood coagula and of necrosed bone. I can only speak from experience concerning the last, and that only in two cases.

J. C. A., æt 32, was thrown from his buggy, sustaining a compound fracture of the ankle, involving both bones. The tibia was broken about two inches above the joint, the proximal end protruding through the tissues. The fracture was reduced and a fixed dressing put on with fenestrum over the wound. The case did fairly well for about two weeks, granulations were thrown out, but there was a portion of bone denuded of periosteum, which was elevated and which the granulations would not cover. A part of this bone was chiselled off and the wound did better, but there were still two or three points uncovered. Papoid powder was dusted over these points each day and covered with protective. The digestion of bone was not rapid, but satisfactory, and in five days the granulations had covered the entire exposed bony surface, and in a short time the wound was completely healed. While the action here on dead tissue was beautifully illustrated, digesting and disintegrating it, its action on the surrounding live tissues was only of a cleansing and nourishing character. Papoid is an antiseptic of much value, and its uses in surgery are so manifold as to warrant for it a rich field of usefulness in the near future.

## GASTRIC CATARRH—

There are many members of our profession who, after years of trial, have almost lost faith in the pepsins; and especially is this true in those cases of so-called atonic dyspepsia, in which pepsin has been relied on and found wanting, and there are thousands of such cases which daily present themselves to physicians for treatment. The thinking members of our profession have lost faith in pepsin, and only continue to prescribe it in a routine sort of way, largely from habit, but more especially because they have been unable to find anything better. To such I say, try Papoid and you will not be disappointed. **It may be stated without the fear of contradiction that Papoid under the conditions indicating the use of animal pepsin will produce some results while animal pepsin under the conditions indicating the use of Papoid will produce no results whatever. It may be further stated that Papoid under Papoid conditions produces greater results than pepsin under pepsin conditions!** Papoid is indicated in any case where there is a deficiency of the gastric juice, no matter from what cause; in gastric catarrh, acute or chronic; in cases of anaemia and general debility, productive of deficient blood supply; in chronic alcoholism, which is always accompanied by an excess of unhealthy mucus in the alimentary canal; in the vomiting of pregnancy and all irritable conditions of the stomach associated with pain and vomiting. In duodenal and intestinal indigestion, Papoid is infinitely superior to pancreatin. These are no imaginary statements, but are based upon absolute results from practical experience, and from records that cover both negative and positive results.

The most convincing proof of the efficacy of Papoid in gastric catarrh was in the case of a patient upon whom I had made a gastrostomy for oesophageal stricture (malignant). Food was passed into the stomach through a rubber tube for a number of weeks. This food was predigested, and nature was aided in every way possible by pepsins, pancreatin, etc. Though there was improvement in the general condition of the patient, he suffered from an excess of acid and a hypersecretion of mucus which produced a most annoying nausea. Papoid, grains two, soda bicarb., grains five, made into a powder and given after each feeding, entirely relieved this trouble. Later on retrograde dilatation of the oesophagus was made, enabling the patient to swallow, and for eight months, the length of time he lived afterward, he continued to take Papoid and could not be induced to leave it off. Without Papoid there would be such an excessive secretion of mucus as to almost entirely preclude digestion, and life to him was a burden.

During the past summer I have treated many cases of infantile diarrhoea. In a majority of these cases Papoid, given in conjunction with Salol, has given relief. As previously mentioned, these observations have been drawn from actual experience in practice, and have been jotted down at odd times in the hope that other busy practitioners might derive the same benefit from a trial of Papoid that I have."

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*"The Medical Standard," January, 1893.*

## PAPOID IN DIPHTHERIA.

[Editorial.]

"Dr. A. J. Park, of Chicago, has had occasion to resort to Papoid in several cases of diphtheria with most gratifying results. He first removes every trace of mucus, and then applies the Papoid with a camel's hair pencil, two drams and a half to the ounce, to the inflamed and diseased surfaces. In membranous croup it has achieved wonderful results. If applied early and diligently it will arrest inflammatory action, and stop the formation of the false membrane and morbid exudations, which prove fatal in the majority of cases. Even intubation has not, up to this time, vindicated the wisdom of its adoption in a large percentage of cases, unless resorted to very early in the attack."



*"Medical Summary," January, 1893.*

## A REMARKABLE FORMULA.

By R. J. FRITZINGER, M. D.

R	Papoid.....	3 ss.
	Pancreatin.....	3 ss.
	Sodæ bicarb.....	3 ij.

M. ft. chart. No. xii. Sig.—One powder after meals.

"For about a year, I have been using this formula in a number of cases with such extraordinary results that I feel justified in placing it before the readers of the Summary. I have no formulary and make use of no set prescriptions, as a rule, but this combination has been so satisfactory in its effects that I prescribe it frequently, and hope this communication may extend its scope of usefulness in the many complaints, concomitants of faulty nutrition, gastro and gastrointestinal irritation, caused by a weakened and imperfect digestion.

Faulty nutrition in the sense of imperfect digestion and assimilation, is the cause of many disorders that are perplexing and difficult of diagnosis, and proper treatment directed to a perverted condition of the alimentary functions will often cause apparently alarming symptoms to disappear with surprising quickness. This fact was very forcibly exemplified to me by the symptoms and the treatment of the case of B., an intelligent mechanic in charge of the stationary engine in a large mercantile house on Market street. He had intense pain at irregular intervals in the right hypogastric region for over six months, and when I first saw him the pain had become localized and fixed, although somewhat paroxysmal in its nature, and his face had the pinched and anxious appearance so often symptomatic of serious abdominal lesions. From its persistently recurrent character, associated with the violent pain, his family physician and several homœopathic doctors in consultation had diagnosed the trouble under the general head of 'gravel,' as the patient stated it; but how they could arrive at this conclusion, except for the reasons mentioned, I shall not attempt to explain.

At this stage decided febrile symptoms were present, significant of inflammatory complications—in fact, all the symptoms seemingly indicated appendicitis, aggravated by neglected, if not positively injurious treatment. But it is only the treatment which I wish to emphasize, which consisted of the administration of one of the above powders three times a day, with the addition of one-sixth of a grain of calomel to each powder, resulting in the relief of the pain in the course of an hour after the first dose, nor has the patient suffered the slightest pain or any inconvenience whatever since.

I have several more strikingly illustrative cases bearing on this theory and treatment to which I shall refer in a later communication."

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*"Times & Register," January 28, '93.*

## PAPOID AFTER LATE SUPPERS.

"If Owen says Papoid is a trump it must be true; for Owen is that sort of a man. I have used it mostly for men who will go out at night and eat lodge suppers, lobster salad especially, and for them I always recommend a tablet or two of Papoid."

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*"Medical Fortnightly," January 16, '93.*

## OBSERVATIONS ON THE CLINICAL USES OF PAPOID.

"Dr. Arch Dixon, of Henderson, Kentucky, records his experience with one of the newer digestants, Papoid, in the Doctors' Weekly of December 24th. Amongst the noticeable features of its potentiality, he mentions that it acts in either acid, alkaline or neutral media, and its affinity for fibrin is so great that, being placed in contact with it, no amount of washing will remove or stop its action; hence its usefulness in Diphtheria, etc., or where there is false membrane. For such use, the author recommends the Papoid Glycerole, which is more permanent than the watery solutions. If the claim made for its efficacy in liquefying

and doing away with slough in connection with ulcers, etc., hold good, it will certainly assume a prominent place as a medicament of great value, for it is asserted that it practically dispenses with the necessity of the use of the curette under such circumstances. Papoid powder is sprinkled over the lesion, covered with protective strips, and on the following day the markedly beneficial effect is apparent in the disintegration of the fibrous or sloughing covering, leaving a clean, healthy looking surface for granulation. It is likewise efficacious in the treatment of abscess cavities, removal of coagula, etc."

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*"Bacteriological World," December, '92.*

### **PAPOID IN DYSPEPSIA.**

By J. H. KELLOGG, M. D.

[Editorial.]

"A. J. Park, M. D., of Chicago, has recently published a small series of cases which are illustrative of the good effects derived from the use of Carica Papaya in functional disorders of the stomach. The three cases described were all manifestly benefited by the use of the remedy, although other rational means were used at the same time. Most of these patients had tried a great variety of remedies before, however, without benefit, so that Dr. Park felt justified in giving Papoid credit for the remarkable improvement observed. No analysis of the stomach fluid was made in these cases, and so it is not possible to state exactly what was accomplished by the Papoid, which would certainly be very desirable; but its empirical use seems to have been attended by good results. Nearly all observers who have studied stomach liquids by modern chemical methods, agree that a deficiency of pepsin is not the most common of the morbid conditions present in functional disturbances of the stomach; nevertheless, there is a certain proportion of cases in which this deficiency does exist, and for such cases Papoid seems to be a most valuable remedy. It is absolutely free from foreign elements, being of vegetable origin, and does not produce the toxic substances which are sometimes found accompanying peptic digestion,—probably in cases in which the pepsin employed is impure, and hence sets up putrefactive processes in addition to peptic digestion."

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*"Medical Century," January, '93.*

### **DIPHTHERIA—ITS TREATMENT.**

Chicago Academy of Medicine.

"Dr. Beebe relies mainly on the second trituration of Mercurious cyanuret and Rhus tox internally and the local application two or three times a day of Papoid, which he claims digests the membrane."

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*"The Medical Independent," February, '93.*

"Papoid is the active principle of the juice of the trunk and fruit of the Carica Papaya, or South American Melon Tree. It is a powerful digester and has the effect of dissolving the [diseased] tissues of the body; it is valuable in dyspepsia, pseudo membranous croup, and catarrh of all forms."

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*"The Medical Visitor," February, 1893.*

By R. ST. JOHN PERRY, M. D.

"Soon after my return to America there appeared on the market a purified extract of the paw-paw fruit called Papoid, prepared by Johnson & Johnson, the advent of which revived memories of my African experiences, and set me to work again.—The form in which Papoid was presented opened up new fields, and I at once prepared to enter them. Open wounds and ulcerations I already knew would readily yield to the drug, and I was anxious to try it in other forms. Gonorrhœa was the first disease to offer itself for a test, and it succeeded passably

well; that is, the patient was cured no slower or faster than by other means. Vaginitis was next tried and with marked benefit. **I used tampons of wool and cotton wet with a solution of Papoid, and within a week every sign of the discharge had ceased.** Then I tried it in some cases of ulcerated cervix uteri with most satisfactory results. **But my best cases were those of cystitis, whether acute or chronic. Cases which came to me after years of suffering were readily relieved and rapidly cured.** My treatment in these cases was to wash the bladder thoroughly with clear warm water until the water came away clean and odorless, then rinse out with a very weak solution of soda bicarb., after which five grains of Papoid were injected, dissolved in a suitable quantity of warm water. This was done anywhere from once in two days to five or six times in one day according to the severity of the case.

"During the past five years I have used the paw-paw in almost every disease where there was inflammation with pus or mucus, and where the parts were get-at-able, and I have never had occasion to regret its use. My experience leads me to believe that while the African paw-paw is a most efficient aid to digestion, its use is not limited to that field. **It has a power of destroying abnormal tissues that should be put to a good use.**"

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*"The Medical Era," Jan., '93.*

## THE TREATMENT OF DIPHTHERIA.

By CURTIS M. BEEBE, Chicago.

"Five per cent. of Papoid in equal parts of glycerine and water must be used every hour, night and day.

"The prescription is almost never filled correctly with fresh Papoid at the corner drug store, but should always be filled by a responsible druggist. It will positively digest all the membrane within reach of the swab; except when used only in the very latest stages, where the exudation is covered by a gangrenous slough.

"With Papoid pure, fresh and of sufficient strength, mercury and Rhus tox., you will cure almost all of your cases of pharyngeal diphtheria if you are called at the beginning of the disease."

Dr. Beebe (closing the discussion): "I shall occupy but little of your time in my closing remarks. I desire to emphasize what I stated at the beginning, that I have used Papoid for about four years with marked success. I began to use it as soon as I learned of it. I believe every gentleman here to-night is going to treat diphtheria in his own way, and that way which his experience leads him will be the best. I can remove the diphtheritic membrane in a child, three or four years of age, with an application of Papoid, making two visits a day. At every visit, if you have the right preparation of Papoid, you can see the membrane melt away. Papoid is like pepsin, a digestive agent. After the application of Papoid to the surface of the membrane, the gangrenous portion is digested. It turns white. You cannot concentrate the Papoid exclusively over the membrane, as it will diffuse itself to some extent. You will find in a large proportion of cases, excepting in those where there are thick, gangrenous cords over the membrane, if you apply Papoid to the whole surface of the membrane, you will gradually see the membrane disappearing. It will do it more quickly than anything else I have used. I have used Peroxide of hydrogen very faithfully. I treated two cases equally severe, one with Papoid, and the other with Peroxide of hydrogen, and I think there is decided advantage on the side of the former. Papoid can be taken just as Professor Knoll uses carbolic acid in the beginning, and as Drs. Grosvenor and Hedges use Peroxide of hydrogen. If you use Papoid in the same way, every hour at the beginning, you will find in a few hours there will not be any membrane left. It will be digested. The diphtheria, localizing itself in the throat, when the membrane is digested, disappears, and the patient gets well."



# Forms of Papoid and Prices.

PAPOID—Pure,	(Powder form).....	In ozs.	\$3 50
“ “	“ “ .....	½ ozs.	1 75
“ “	Tablets .....	Bottles containing 100	1 25
PAPOID AND SODA BICARB.	“ .....	“ “ 100	1 25
PAPOID AND BORACIC ACID,	“ .....	“ “ 100	1 25
PAPOID AND NUX VOMICA,	“ .....	“ “ 100	1 25
PAPOID GLYCEROLE (Permanent Liquid Preparation)		3 oz. Bottle	1 25

## Formulae of Tablets.

PAPOID—Pure .....	Papoid	gr. i.
	{ Papoid	gr. i.
	{ Soda Bicarb.	grs. iii.
PAPOID AND SODA BICARB .....	{ Sacch. Lactis	} qs.
	{ Menth. pip.	
	{ Papoid	gr. i.
	{ Boracic Acid	grs. iijs.
PAPOID AND BORACIC ACID.....	{ Sacch. Lactis	} qs.
	{ Menth. pip.	
	{ Papoid	gr. 1½
	{ Soda Bicarb.	gr. ii.
PAPOID AND NUX VOM.....	{ Ext. Nux Vom.	gr. ¼
	{ Aromat. Powder	gr. ½

# AUTHORITIES

ON THE USE OF

## PAPOID

Asch,  
Brownell,  
Bruce,  
Billington,  
Bouchut,  
Baginsky,  
Burnside,  
Beebe,  
Clayton,  
Croner,  
Cushing,  
Culver,  
Chittenden,  
Dreier,  
Dearborne,  
Dixon,  
Flatow,  
Fraentzel,  
Fleiss,  
Fritzinger,  
Grant,  
Green,  
Gerould,

Houghton,  
Heinemann,  
Herschell,  
Hyde,  
Hale,  
Kellogg,  
Kohts,  
Kriege,  
Kuhne,  
Larrabee,  
Love,  
Lankester,  
Livezey,  
Lasker,  
Lewis,  
Leydon,  
Mulhall,  
Marvin,  
Morton,  
Manges,  
Morris,  
Ortel,  
Osborn,  
Owen,

Page,  
Platt,  
Peckholt,  
Pearson,  
Perry,  
Park,  
Rossbach,  
Ruttan,  
Richardson,  
Rose,  
Ross,  
Ruark,  
Richmond,  
Stowell,  
Stuckey,  
Schaeffer,  
Smith,  
Thornton,  
Van Zant,  
Wright,  
West,  
Wile,  
Woodbury.

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# IN DIPHTHERIA.

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One of the most important applications of Papoid is its use in removal of the false membrane formed on the tonsils and other parts of the pharynx or on the larynx in diphtheria and croup. Abundant reports show that,

When Papoid is applied to the diphtheritic membrane, four distinct though allied effects are observed.

That it seems to have a penetrating property which is exerted with such rapidity that when once really applied no amount of washing of the parts will remove it.

That in a few hours the membranes are dissolved or detached, and do not re-form, because—

The bacteria of the disease are also destroyed.

The formation of the specific poison or “toxalbumen” of diphtheria is arrested and abnormal body temperature falls.

The removal of the morbid growths from the throat relieves at once the embarrassment of respiration, and in a large majority of cases a complete cure is effected.

See pages 18, 23, 24, 25, 26, 28, 35, 36, 37, 38, 39 of this pamphlet.

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**Watery Solutions must be made fresh.**



# Catarrh of the Stomach.

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“20 minutes before breakfast take 5 grains  
**PAPOID POWDER** upon the tongue—dry.

Follow immediately with one-third cupful  
very hot water.

At beginning of each meal take tablet of  
**Papoid and Boracic Acid**, dissolved in table-  
spoonful of water.”

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See pages 20, 21, 22, 27, 28, 33, 36 of this pamphlet.

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# PAPOID GLYCEROLE

## **A Permanent Liquid Form of Papoid for Use in Diphtheria, Surgery, and for External Application.**

Papoid Glycerole is the most satisfactory method of applying Papoid externally. It is a highly concentrated neutral extract holding Papoid in its most active form. A perfect and permanent solution that will combine with all suitable media.

Its strength represents a five per cent. solution of Papoid.

### **Solvent for Diphtheritic Membrane.**

Use full strength for painting, dilute for spray.

#### **Crusts, Scales and Vesicles in Skin Diseases,**

Use full strength and let it dry on.

#### **Boils, Carbuncles and Tumors,**

Applied or injected full strength.

#### **Cancerous Growths, False Tissues and Fissures,**

Applied full strength on sponge or tampon.

#### **Abscesses, Ulcers, Pus, Blood Clots,**

Injected full strength or diluted with warm water.

Any of the antiseptics mentioned in this manual, may be combined with Papoid Glycerole.

An alkaline solution made by adding 5 grains bicarbonate soda to each 100 minims Papoid Glycerole used, is advantageous and more active in many cases, especially in fatty secretions.

Papoid is a surgical solvent at any temperature, but where convenient, parts should be kept warm with hot cloths.

# Drugs that may be given in Conjunction with Papoid.

It is often desirable to give other drugs in the same course of treatment with Papoid.

Few drugs that would be selected for prescription with Papoid are incompatible with it. **(With animal pepsin few drugs can be given, else the pepsin is destroyed. Theoretically Papoid can be used with all drugs.)**

It is the best rule to give Papoid by itself, combined only with an alkali or acid, as may be indicated, and give other drugs an hour or more before or after.

The following is a partial list of drugs that may be used in the same course of treatment in which Papoid is used :

Alcohol,	Corrosive Sublimate,	Morphine,
	Chloroform,	Nux Vomica,
	Creasote,	Oils Essential,
	Capsicum,	Oil Cod Liver,
	Camphor,	Opium,
Acid, {	Chalk,	Podophylin,
	Cocoa,	Potassium Salts,
	Cinchona,	Peppermint,
	Cascara Sagrada,	Pulsatilla,
	Ginger,	Quassia,
	Gentian,	Quinine,
	Glycerine,	Rhubarb,
	Hydrastis Canadensis,	Strychnine,
Asafoetida,	Hops,	Salol,
Ammonia, {	Ipecac,	Sodium Salts,
	Lime,	Serpentaria,
Ammoniac,	Liquor Potass,	Taraxacum,
Arsenic,	Lime Water,	Thymol,
Aromatics,	Lithia.	Valerian,
Antipyrin,	Magnesia,	Veratrum Viride.
Aloes,	Mustard.	
Boracic acid,		
Bismuth,		
Bicarbonate soda,		
Belladonna,		
Charcoal,		



# PAPOID IS NOT EXPENSIVE.

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PAPOID COSTS THE DISPENSER  
LESS THAN ONE CENT A GRAIN  
[IN POWDER FORM.]

“THE dose of PAPOID ordinarily is one grain.  
Five grains or more may be used, the  
only objection being that of useless expense and waste,  
except where very prompt effects are desired.”

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## PAPOID TABLETS

(in bottles containing 100 of one grain each), cost \$1.25 or

ONE AND ONE-QUARTER CENTS  
EACH.

### THUS

it will be seen that the cost of the AVERAGE DOSE OF  
PAPOID in any form is less than the average dose of  
Pepsin, Pancreatin, or most of the many other drugs  
commonly used.

Tablets produce more prompt results if dissolved in a  
tablespoonful of water.

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# SUMMARY OF FORMULÆ. Tear this out for ready reference.

<p><b>Formulæ Useful In Stomach Catarrh.</b></p> <p>R Papoid, one and one-half grs. Soda Bicarb., 3 grs. Sac. Lactis, 1 q. s. Ol. Menth. 1 Pulv. I. One three times a day in water, immediately after eating.</p> <p><b>In Cases of Delicate Stomach.</b> R Papoid, 18 to 36 grs. Mucil. acac., 1 oz. Aque ad. 6 oz. M. ft. mistura—one teaspoonful three times a day, after eating.</p> <p>R Papoid, 18 grs. Ol. M. Pip., 3 drops. Soda bicarb., 36 grs. M. f. pulvis xii. Sig. One to be taken three times a day, after meals, in a little water.</p> <p><b>Fermentation and Decomposition of Contents of Stomach.</b> R Papoid, 1½ grs. Acid borac., 1½ grs. M. f. pulv. i. Dose, one or two powders two or three times a day, as required.—</p> <p>Or, R Tablets Papoid and boracic acid</p> <p>Dose, one or two, two or three times a day, as required.</p> <p>R Tablets Papoid and soda, No. 12</p> <p>One three times a day after meals.</p> <p><b>Stomach Catarrh of Children.</b> R Papoid, 1½ grs. Sacch. lactis, 1 gr. Soda bicarb., 1 gr. M. f. pulv. i. Dose, one before each meal.—</p>	<p><b>In Pain or Irritation.</b> R Papoid, 24 grains. Bismuth sub. carb., 20 grs. Soda bicarb., 24 grs. M. Div. in chart No. 12. Dose one before each meal.</p> <p><b>When Food Does Not Leave Stomach.</b> R Papoid, 30 grs. Sacch. lactis, 30 grs. Tr. nux vom., 30 minims. Mft. chart No. 18. Wrap in waxed paper. M. Sig. One after meals.</p> <p><b>Chronic Gastric Catarrh.</b> Dilatation of the stomach, due to abnormal fermentation. R Papoid, 1½ grs. Boracic acid, 4 gr. M. One powder. Dose one with meals.—</p> <p>R Papoid, 10 grs. R Boroglyceride, 30 minims. R Aque q. s. ½ oz. M. Dose, one-half teaspoonful in water just before meals.</p> <p><b>Constipation.</b> R Aloin, gr. 1-5. Extract bellad., gr. ½. Extract nux vomica, gr. ¼. Papoid, 1 Mft. pill No. 1. (Use no water to form mass.) (Keep in air tight vials.) Dose, one pill once or twice a day.</p> <p><b>Habitual Constipation.</b> R Aloin, gr. 1-6. Ext. cascara sagrada, 3 grs. Ext. bellad., ½ gr. Papoid, 1½ grs. Mft. pill No. 1. One pill at bed time.</p>	<p><b>Miscellaneous Formulæ.</b> Selected from European and American authorities and private practice.</p> <p><b>Acute Gastric Indigestion.</b> R Papoid, one and one-half grs. Sugar milk, 1 gr. Bicarbonate soda, 5 grs. M. ft. One powder. Take after meals.</p> <p><b>In Epigastric Pain.</b> R Papoid, 12 grs. Pulv. opium, 3 grs. M. Div. into 12 powders. Dose, one after each meal.</p> <p><b>Acute Duodenal Dyspepsia.</b> Purge. R Castor oil, 1 oz. Tinct. opium, 10 minims. Papoid, 3 grs. M. ft. One adult dose.</p> <p>R Magnesia calcis, 1 dram. Papoid, 3 grs. One adult dose.</p> <p><b>Charcoal and Papoid Useful in Flatulence.</b> R Carb. light, 8 grs. Papoid, 2 grs. M. One powder. Dose, one powder immediately after eating.</p> <p><b>Headache due to Indigestion.</b> R Papoid, 10 grs. Divide into 5 powders. Put in capsules. One when necessary.</p> <p><b>Alcoholic Catarrh.</b> Sip a tumbler of hot water on rising; after lunch and dinner take R Papoid, 18 grs. Divide in 12 powders. Take one in a little water, quarter hour after eating.</p>	<p><b>Atomic Dyspepsia when associated with Indigestion.</b> R Papoid, 2 grs. Potophyllin, one-twentieth gr. Hydrastin, one-twentieth gr. Extract hy. oscyana ¼ gr. Extract cascara sagrada, ½ gr. Make one pill Dose, one pill three times a day, after meals.</p> <p><b>Dyspepsia associated with Anæmia.</b> R Papoid, 2 grs. Quin. sulph., 1 gr. Sacch. lactis, 1 gr. Glycer. tragac. q. s. Ft. pil. i. One pill three times a day, after meals.</p> <p>R Papoid, 1½ grs. Sacch. lactis, 4½ grs. Ft. pulvis i. One powder three times a day, before meals.</p> <p><b>Digestive Disturbances of Nursing Infants.</b> Decrease the amount of milk, and give R Papoid, 6 grs. Acid lact., 24 drops Tr. vanilla, q. s. Glycerine, 1½ oz. Aqua, 8½ ozs. M. Dose, dessertspoonful after meals.</p> <p><b>Acidity.</b> R Papoid, 1½ grs. Soda bicarb., 5 grs. Sacch. lac., 1 gr. M. One powder. Dose, one powder after meals.</p> <p>R Magnesia calcined, 10 grs. Papoid, 1 gr. M. ft. One powder. A powder in a wine glass of water when required.</p>	<p>R Bismuta, 36 grs. Papoid, 19 grs. Opil. pulv., 3 grs. M. ft. 12 powders. One after meals.</p> <p><b>Acidity of Pregnancy.</b> R Pulv. Ipecachuana, 6 grs. Papoid, 24 grs. M. ft. 12 powders. Dose, one as required.</p> <p><b>Acidity of Gout.</b> R Papoid, 2 grs. One powder. Give in teaspoonful lemon juice diluted with water so as to make a sour lemonade.</p> <p><b>Acidity of Stomach—Heartburn.</b> R Papoid, 12 grs. Acid Borac., 36 grs. M. ft. Chart No. xii. One powder dry on tongue during attack.</p> <p><i>In obstinate cases associated with liver derangement.</i> R Powd. potophyllin, gr. ¼. Papoid, 25 grs. M. ft. ctt No. 24. Dose, one night and morning. When associated with hicough, follow with R Tr. nux vom., 5 minims. Acid nit. dil., 10 minims. Aqua ad., ½ oz. M. One dose.</p> <p><b>Vomiting.</b> In vomiting of gastric catarrh, morbing sickness of chronic alcoholism, inflammation, acidity, undigested food, some cases of vomiting from pregnancy, Papoid affords a prompt means of arrest and prevention. R Papoid, gr. iii. Drink in a glass of effervescent soda or mineral water. Affords immediate relief.</p>
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WATERY SOLUTIONS MUST BE MADE FRESH.



# SUMMARY OF FORMULÆ. Tear this out for ready reference.

## For Delicate Stomachs.

R Papoid, 36 grs.  
Mucil. acacia, 3 ozs.  
Boroglyceride,  $\frac{1}{4}$  oz.  
Aqua aii., 8 ozs.  
M. ft. Mixture. One-half tablespoon-  
ful three times a day after eating.  
Keep in a cool place.

## Vomiting in Stomach Catarrh.

R Papoid, 4 grs.  
Sugar milk, 3 grs.  
Boric acid, 2 grs.  
Mix. One powder.  
To be taken directly after meals.

## Vomiting in Pregnancy.

R Papoid and Soda Tablets,  
One tablet before each meal.

Antiseptic Mixtures.  
For securing antiseptic action in fer-  
mentation, flatulence, etc.

R Salicylate bismuth.

Magnesia.  
Soda bicarb. aa. 50 grs.

Papoid, gr. 60.

Divide into thirty doses.

R Salicylate of bismuth.

Salol, aa. 60 grs.

Papoid, gr. 60.

Divide into 30 doses.

R. Salicylate of bismuth.

Beta-naphthol.

Powd. charcoal aa. 50 grs.

Papoid, 60 grs

Divide into 30 doses.

R Papoid, 18 grs.

Salicylic acid, 60 grs.

Glycerine, 2 drams.

Aqua ad., 4 ozs.

M. ft. Mst. Dose, one teaspoon-  
ful before meals.

## Flatulence.

R Papoid, 24 grs.  
Aqua chloroform, 2 drams.  
Aqua menth. pip. 6 ozs.  
M. ft. mist. Keep in a cool place.  
Dose, one tablespoonful during or just  
before eating.

R Powd. charcoal, 60 grs.

Soda bicarb., 45 grs.

Magnesia calcined, 30 grs.

Papoid, 40 grs.

M. Divide into 30 powders. Dose,  
one powder one-half hour before  
meals.

R Papoid, 30 grs.

Beta naphthol, 5 grs.

Salicylate bismuth, 15 grs.

Magnesia calcid., 15 grs.

Divide into 30 powders. Take one at  
meal times.

## Elixir Papoid.

R Papoid, 32 grs.  
Glycerine, 1 dram.  
Aromatic elixir Nat. formulary  
q. s., 4 oz.

One tablespoonful contains 4 grs.  
Papoid. Dose, one or two teaspoon-  
fuls.

Papoid Compound. — DYSPERSIA

Powders.

R Papoid.

Bismuth.

Powd. cubeb.

Powd. rhei, aa. 12 grs.

M. Div. in cth. No. xii.

One at meal time.

Papoid, Bismuth and Strychinine

Powders.

R Papoid,  $\frac{1}{16}$  grs.

Bismuth sub. nit.,  $\frac{1}{16}$  grs.

Strychinine, one thirtieth gr.

One powder.

## Elixir Papoid, Quinine and Strychinine.

R Papoid, 16 grs.  
Glycerine, 2 drams.  
Strychinine, two fifteenths gr.  
Aromatic elixir N. F. q. s., 1 oz.  
Dose, one teaspoonful

## Flatulent Diarrhea.

R Papoid, 12 grs.  
Pulv. Opil., 3 grs.  
Glycerine, 2 drams.  
Fiet massa et. dir in pil. xii. One  
to be taken after each meal.

## Formule for the Use of Papoid in Diphtheria.

R Papoid, 30 grs.  
Divide in 6 powders, put up in  
waxed papers.  
Sig. One powder to be rubbed up  
with sufficient water, to dissolve it.  
Apply to the throat with a brush every  
hour or half hour. —  
R Papoid 6 grammes, 2 1/2  
Aqua q. s. O. C., 60.  
Ft. solution. Paint with a very soft  
brush every 15 or 20 minutes. —

R Papoid, 24 grs.

Glycerine.

Aqua aa.,  $\frac{1}{2}$  ounce.

Apply every half hour with a mop. —

## SOLUTION FOR PAINTING.

R Papoid, 10 grs.  
Aqua, 200 minims.  
To be made fresh daily and kept in a  
cool place. —  
R Papoid, 60 grs.  
Glycerine, 4 drams.  
Aqua, 4 drams.  
Apply every hour or two with a  
feather or brush. —  
R Papoid, 2 drams.  
Beta-naphthol, 3 grs.  
Acid hydrochol. dil., 15 drops.  
Ac. distill. ad., 4 ozs.

R Papoid, 2 drams.

Beta-naphthol, 3 grs.

Acid hydrochol. dil., 15 drops.

Ac. distill. ad., 4 ozs.

M. ft. Sig. Use carefully and thor-  
oughly by means of hand atomizer  
every half hour on throat or through  
nostrils or posteoronates and pharynx,  
if deposit extends to these localities. —

## Diphtheria and Membranous Group.

R Papoid, 60 grains.  
Glycerine, 4 drams.  
Water, 1 dram.  
M. Apply with a brush.

R Papoid, 30 grs.

Sol Lister, 60 grs.

Mix. Blow 10 grains in throat every  
two hours with a glass tube —

## Eczema and Psoriasis.

To remove scaly formation and  
assist other treatment the following  
has been found remarkably suc-  
cessful:

R Papoid.

Boric acid, powd. aa., 30 grs.

Glycerine.

Aqua camphor, aa., q. s., to form  
paste.

Apply night and morning, allowing  
the paste to dry on the skin.

## Formule for Surgical Uses.

Powder for Dusting. — ALKALINE.  
R Papoid, 50 grs.  
Soda bicarb., 10 grs.  
Mix thoroughly.

## Powders for Dusting. — ANTISEPTIC.

R Papoid 50 grs.  
Powdered boric acid, 50 grs.  
Mix thoroughly and sift.

## Pastes.

R Papoid, 50 grs.  
Glycerine,  $\frac{1}{16}$  drams.  
Mix intimately.

R Papoid, 50 grs.

Powdered boric acid, 25 grs.

Glycerine, 3 drams.

Mix intimately.

R Papoid, 50 grs.

Boroglyceride, 2 drams.

Mix intimately.

R Papoid 50 grs.

Soda bicarb., 20 grs.

Mix. Make into a paste with water.

## Solution for Injection.

R Papoid, 50 grs.  
Glycerine, 2 drams.  
Aqua q. s., 1 oz.

## Alkaline Solution.

R Papoid, 50 grs.  
Soda bicarb., 20 grs.  
Glycerine, 2 drams.  
Aqua q. s., 1 oz.

## Antiseptic Solution.

R Papoid, 50 grs.  
Boric acid, 15 grs.  
Glycerine, 2 drams.  
Aqua q. s., 1 oz.  
Mix.  
R Papoid, 1 dram.  
Boroglyceride, 4 drams.  
Aqua, 4 drams.  
Mix. ft. wash.

WATERY SOLUTIONS MUST BE MADE FRESH.







**Papoid - -**

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**Digestion,**

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—BY—

**R. H. Chittenden, Ph. D.**

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